1859-
1959
100
YEARS OF
SERVICE

THE Journal OF THE Kansas Medical Society

MARCH
19 59
VOL. LX
NO. III

IN THREATENED AND HABITUAL ABORTION:

"...high-potency progestational agents [such as NORLUTIN] frequently have the power, when administered in adequate dosage, to arrest and suspend myometrial contractions incident to spontaneous abortion."* This is the conclusion of a group of investigators who studied patients with threatened (and in some cases habitual) abortion. The study group was compared with a control group which was treated with bed rest and mild sedation only. In this control group, the salvage rate was 15.5 per cent. In the group receiving NORLUTIN, 19 of 45 pregnancies were continued—a salvage rate of 42.2 per cent

PREGNANCY SALVAGE WITH NORLUTIN

	Control Group (Treated with bed rest and mild sedation)	Study Group (Treated with NORLUTIN)
Total number of pregnancies	297	45
Number of pregnancies salvaged	46	19
Percentage of pregnancies salvaged	15.5%	42.2%

Adapted from Hodgkinson *et al.**

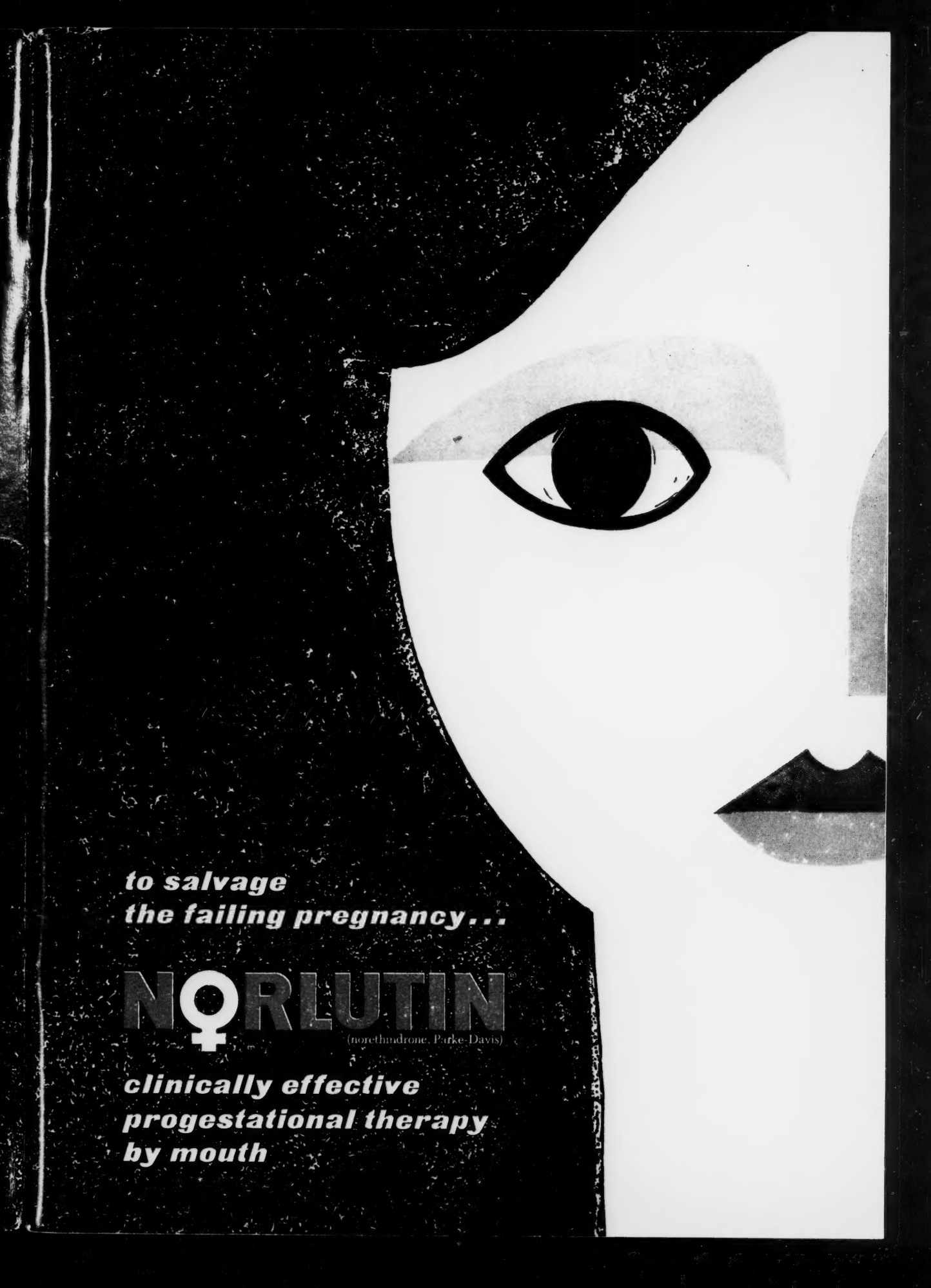
Indications for NORLUTIN: Conditions involving deficiency of progesterone, such as primary and secondary amenorrhea, menstrual irregularity, functional uterine bleeding, endocrine infertility, habitual abortion, threatened abortion, premenstrual tension, and dysmenorrhea.

packaging: 5-mg. scored tablets, bottles of 30.

*Hodgkinson, C. P.; Igna, E. J., & Bukeavich, A. P.: *Ann. New York Acad. Sc.* 71:753 1958.

PARKE, DAVIS & COMPANY
DETROIT 32, MICHIGAN

71958


to salvage
the failing pregnancy...
NORLUTIN
(norethindrone, Parke-Davis)
clinically effective
progestational therapy
by mouth

THE JOURNAL
of the
KANSAS MEDICAL SOCIETY

Volume LX MARCH, 1959 Number 3

TABLE OF CONTENTS

Original Articles

The Medical Center—The Dean's Report on Personnel, Facilities, Budget, and Future Prospects at the School of Medicine—W. Clarke Wescoe, M.D., Kansas City . 109

Tetanus Prophylaxis—The Need for Better Understanding of Its Value—Don R. Miller, M.D., Kansas City 110

Acid Base Balance—Study of Related Cellular Metabolic Considerations—Santiago Grisolia, M.D.; Lewis Mokrasch, Ph.D., and Harold Grady, Ph.D., Kansas City 111

Carcinoma of the Cervix—Study of Diagnosis and Treatment in 1,000 Patients in 28-Year Period—L. A. Calkins, M.D., Kansas City 116

Orabilex—Evaluation of a New Cholecystographic Medium—Galen M. Tice, M.D., Kansas City 118

Electrocardiograms of Weight-Lifters—Study of Findings in 26 Subjects—Russell Etzenhouser; Marvin Dunn, M.D., and E. Grey Dimond, M.D., Kansas City 121

Fluothane—Clinical Appraisal and Report of Its Use in 1,000 Cases—John M. Hansen, M.D.; John I. Davies, M.D., and H. Malcolm Hardy, M.D., Kansas City . . . 126

Cerebral Palsy—The Need for Reevaluation of Obsolete Concepts—Charles M. Poser, M.D., Kansas City 131

Chest X-rays—Analysis of Data from Reading and Re-Reading Films—William Seeman, Ph.D., Kansas City 135

The Artificial Kidney—Its Use in Management of Renal Failure and Poisonings with Consideration of Isolated Jejunal Segment Perfusion for Treatment of Chronic Uremia—Wu-Hao Tu, M.D., and Paul R. Schloerb, M.D., Kansas City 137

Tumor Conference—Paraplegia in Hodgkin's Disease of the Dura 156

Government Medicine—The Doctor and the Health Scheme in Great Britain—Thesis—John D. Dougherty, M.D., Honolulu . . 159

Editorial Board

ORVILLE R. CLARK, M.D., *Editor,* Topeka
DAVID E. GRAY, M.D., Topeka
RICHARD GREER, M.D., Topeka
DWIGHT LAWSON, M.D., Topeka
JOHN A. SEGERSON, M.D., Topeka

Associate Editors

DONALD P. TREES, M.D., Wichita
VERNON E. WILSON, M.D., Kansas City

PAULINE FARRELL, Managing Editor and Advertising Manager

OLIVER E. EBEL, Business Manager
Executive Office: 315 West Fourth Street, Topeka

Ownership: The Journal is a non-profit publication owned and published monthly by the Kansas Medical Society.

Subscription: A year's subscription to the Journal is included in membership in the Kansas Medical Society, with $2.00 of each member's dues apportioned to the Journal. Rates to others, except in foreign countries, $4.00 per year or 60c per copy.

Material: Scientific articles, editorials, and data of general interest are invited from all members. Articles are to be submitted on condition that they are contributed solely to this publication. A right is reserved to reject any material deemed unsatisfactory.

Manuscripts: Only manuscripts that are typewritten on one side, double spaced, and original copies can be accepted. Manuscripts will be returned upon request.

Advertising: All advertising contracts, and all copy from advertisers under contract are subject to approval of the editorial board. Copy should be received by the 15th of the month immediately preceding the month of publication.

Non-Responsibility: Although an effort is made to publish only accurate articles and legitimate advertisements, the Journal denies legal responsibility for any statements, opinions, or advertisements appearing under the names of contributors or concerns.

Entered as second-class matter at the post office at Fulton, Missouri, June 19, 1953, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized on July 2, 1918. Office of Publication: 1201-05 Bluff Street, Fulton, Missouri.

NOW even many cardiac patients may have THE FULL BENEFITS OF CORTICOSTEROID THERAPY

DECADRON—the new and most potent of all corticosteroids, **eliminated fluid retention in all but 0.3 percent of 1500 patients†, and induced beneficial diuresis in nearly all cases of pre-existing edema.**

Decadron*

DEXAMETHASONE

treats more patients more effectively

Therapy with DECADRON has also been distinguished by virtual absence of diabetogenic effects and hypertension, by fewer and milder Cushingoid reactions, and by freedom from any new or "peculiar" side effects. Moreover, DECADRON has helped restore a "natural" sense of well-being.

†Analysis of clinical reports.

*DECADRON is a trademark of Merck & Co., Inc. ©1958 Merck & Co., Inc.

MSD MERCK SHARP & DOHME
DIVISION OF MERCK & CO., INC., PHILADELPHIA 1, PA.

first things first

How well we keep the world's *peace* depends first on how well we keep the world's *people.*

If great injustices, if inequalities in health, food or education exist anywhere... we all face a constant threat to peace.

Now 19 Specialized United Nations agencies and international organizations work around the world to eliminate these inequalities, to diminish these basic causes of wars.

Their activities... plus the more publicized political discussions... make the United Nations *mankind's last great instrument of survival.*

Be an ambassador of the United Nations in your neighborhood. Our government—officially and actively—supports the United Nations, but it is *your* good will and understanding that is its best guarantee of continued success. To receive the informative free pamphlet, "The UN in Action," write: United States Committee for the United Nations, Box 1958, Washington 13, D. C.

UN
WE BELIEVE

ADVERTISING COUNCIL · PUBLIC SERVICE ·

UNITED STATES COMMITTEE FOR THE UNITED NATIONS, BOX 1958, WASHINGTON 13, D.C.

Allergy-free...all day... with this much medication

Typically, the allergic patient can enjoy a whole day's freedom from symptoms with just one Pyribenzamine Lontab in the morning—a whole night of restful sleep with just one Lontab in the evening.

The outer shell of the unique Lontab actually contains an effective dose of Pyribenzamine which is released minutes after the Lontab enters the stomach. Thereafter, medication is released uniformly and continuously from the specially formulated inner core of the Lontab—sustaining antiallergic effect as long as 12 hours.

For patients who need only periodic medication, regular Pyribenzamine tablets provide fast, dependable action, with a minimum of undesirable side effects.

SUPPLIED: Pyribenzamine Lontabs—full-strength—100 mg. (light blue). **Pyribenzamine Lontabs**—half-strength—50 mg. (light green); for children over 5 and adults who require less antiallergic medication. **Pyribenzamine** Regular Tablets, 50 mg. (green, scored) and 25 mg. (green, sugar-coated).

Pyribenzamine® hydrochloride *(tripelennamine hydrochloride* CIBA) **Lontabs®** *(long-acting tablets* CIBA)

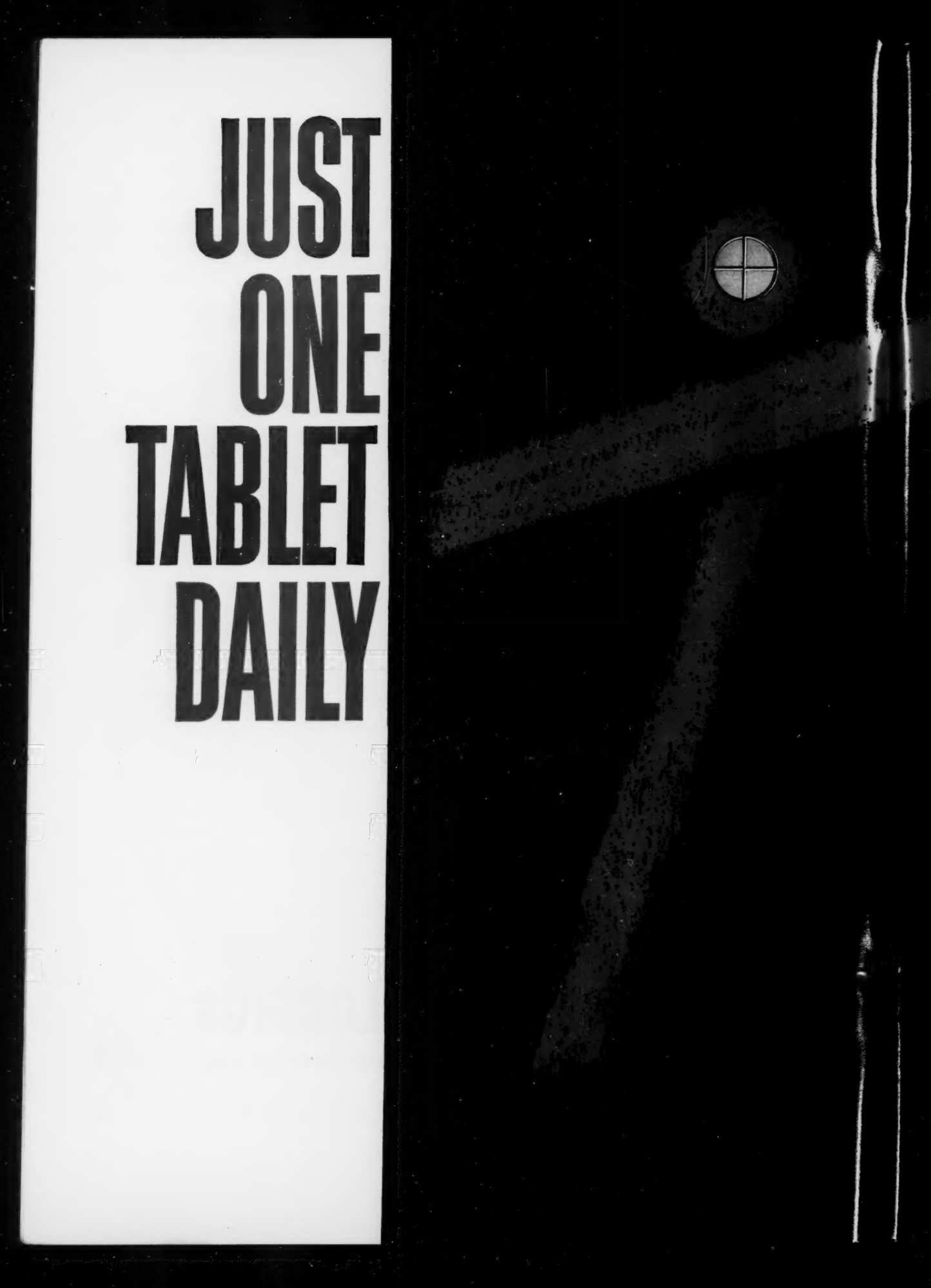
2/2521MK

CIBA SUMMIT, N. J.

Pyribenzamine® Lontabs®

JUST ONE KEEPS YOUR ALLERGIC PATIENT ON A 12-HOUR THERAPEUTIC PLATEAU

JUST ONE TABLET DAILY



provides therapeutic sulfa levels for 24 hours... Highly soluble in acid and alkaline media... rapidly absorbed, producing fast, effective plasma-tissue concentrations sustained for the entire day. Simple, single 0.5 Gm. daily dose minimizes patient dosage confusion. At least equivalent to 4 to 6 Gms. daily of previous sulfonamides. Does not produce renal complications.[1]

with low incidence of sensitivity reactions... KYNEX is extremely low in toxic potential.[2,3] Cutaneous or other objective sensitivity reactions are rare, as demonstrated in a large scale evaluation of clinical toxicity.[2] Also minor subjective reactions are less likely to develop when the recommended dosage is used.[2]

Dosage: Adults, 0.5 Gm. (1 tablet) daily following an initial first-day dose of 1 Gm. (2 tablets).

TABLETS, 0.5 Gm., Bottles of 24 and 100.

also available—KYNEX Acetyl Pediatric Suspension, cherry-flavored, 250 mg. sulfamethoxypyridazine activity per teaspoonful (5 cc.). Bottles of 4 and 16 fl. oz.

1. Editorial, New England J. Med. 258:48, 1958.
2. Vinnicombe, J.: Antibiotic Med & Clin. Ther. 5:474, 1958.
3. Sheth, U. K., et al.: Ibid., p. 604, 1958.

for improved control

WHENEVER SULFAS ARE INDICATED

KYNEX®

Sulfamethoxypyridazine Lederle

Lederle LEDERLE LABORATORIES, a Division of AMERICAN CYANAMID COMPANY, Pearl River, New York

WHATEVER THE ETIOLOGY—

EDEMA OF ANY DEGREE RESPONDS TO DIURIL®

CHLOROTHIAZIDE

MERCK SHARP & DOHME
Division of Merck & Co., Inc. • Philadelphia 1, Pa.

An unparalleled record of safety and efficacy.

DIURIL has proved to be highly effective in overcoming edema associated with a wide variety of fluid retention states including: hypothyroidism, menopausal syndrome, allergy, peripheral phlebitis, arthritis, migraine headache, ascites or peripheral edema due to malignant tumor, and obesity. In the last case, Landes and Peters[1] achieved excellent to good results in nine obese patients in whom overweight was associated with moderate or severe fluid retention.

1. Landes, R. P. and Peters, M.
Postgrad. Med. 23:648, June 1958.

dosage: one or two 500 mg. tablets of DIURIL once or twice a day.

supplied: 250 mg. and 500 mg. scored tablets DIURIL (Chlorothiazide), bottles of 100 and 1000.

DIURIL is a trademark of Merck & Co., Inc.
© 1959 Merck & Co., Inc.
Trademarks outside the U. S.
CHLOTRIDE, CLOTRIDE, SALURIC

any indication for diuresis is an indication for DIURIL

Proven

in over three years of clinical use
in over 600 clinical studies

Specific

FOR RELIEF OF ANXIETY
AND MUSCLE TENSION

Selective

Does not interfere with autonomic function
Does not impair mental efficiency,
motor control, or normal behavior
Has not produced hypotension,
agranulocytosis or jaundice

MEPROBAMATE (WALLACE)
Miltown®

Supplied: 400 mg. scored tablets, 200 mg. sugar-coated tablets.

WALLACE LABORATORIES, New Brunswick, N. J.

CM-8049

REACHING FOR THOSE 9B's NEARLY PUT ME ON THE SHELF...

Reaching for 9B shoes and other top shelf sizes is no joke . . . it gave me a terrible kink in my back.

Before the day was over, I could hardly stoop to push a shoehorn.

I called my doctor that night and picked up the tablets he prescribed.

The pain went away fast—in just 15 minutes—and I was back on the job the next morning! But not one 9B customer came in the whole day!

Percodan®-Demi & Percodan® *Tablets*

Salts of Dihydrohydroxycodeinone and Homatropine, plus APC

FOR PAIN

ACTS FASTER — usually within 5-15 minutes. **LASTS LONGER** — usually 6 hours or more. **MORE THOROUGH RELIEF** — permits uninterrupted sleep through the night. **RARELY CONSTIPATES** — excellent for chronic or bedridden patients. **VERSATILE** — new "demi" strength permits dosage flexibility to meet each patient's specific needs. PERCODAN-DEMI provides the PERCODAN formula with one-half the amount of salts of dihydrohydroxycodeinone and homatropine.

AVERAGE ADULT DOSE: 1 tablet every 6 hours. May be habit-forming. Federal law permits oral prescription.

Each PERCODAN* Tablet contains 4.50 mg. dihydrohydroxycodeinone hydrochloride, 0.38 mg. dihydrohydroxycodeinone terephthalate, 0.38 mg. homatropine terephthalate, 224 mg. acetylsalicylic acid, 160 mg. phenacetin, and 32 mg. caffeine.

AND THE PAIN WENT AWAY FAST

Endo®

Literature? Write
ENDO LABORATORIES
Richmond Hill 18, New York

*U.S. Pat. 2,628,185

THE HOUSE-CALL ANTIBIOTIC

Wide range of action is reassuring when culture and sensitivity tests are impractical.

Effectiveness demonstrated in more than 6,000,000 patients since original product introduction (1956).

COSA-SIGNEMYCIN®

glucosamine-potentiated tetracycline with triacetyloleandomycin

capsules	*oral suspension*	*pediatric drops*
125 mg. 250 mg.	raspberry flavored, 2 oz. bottle, 125 mg. per teaspoonful (5 cc.)	raspberry flavored, 10 cc. bottle (with calibrated dropper), 5 mg. per drop (100 mg. per cc.)

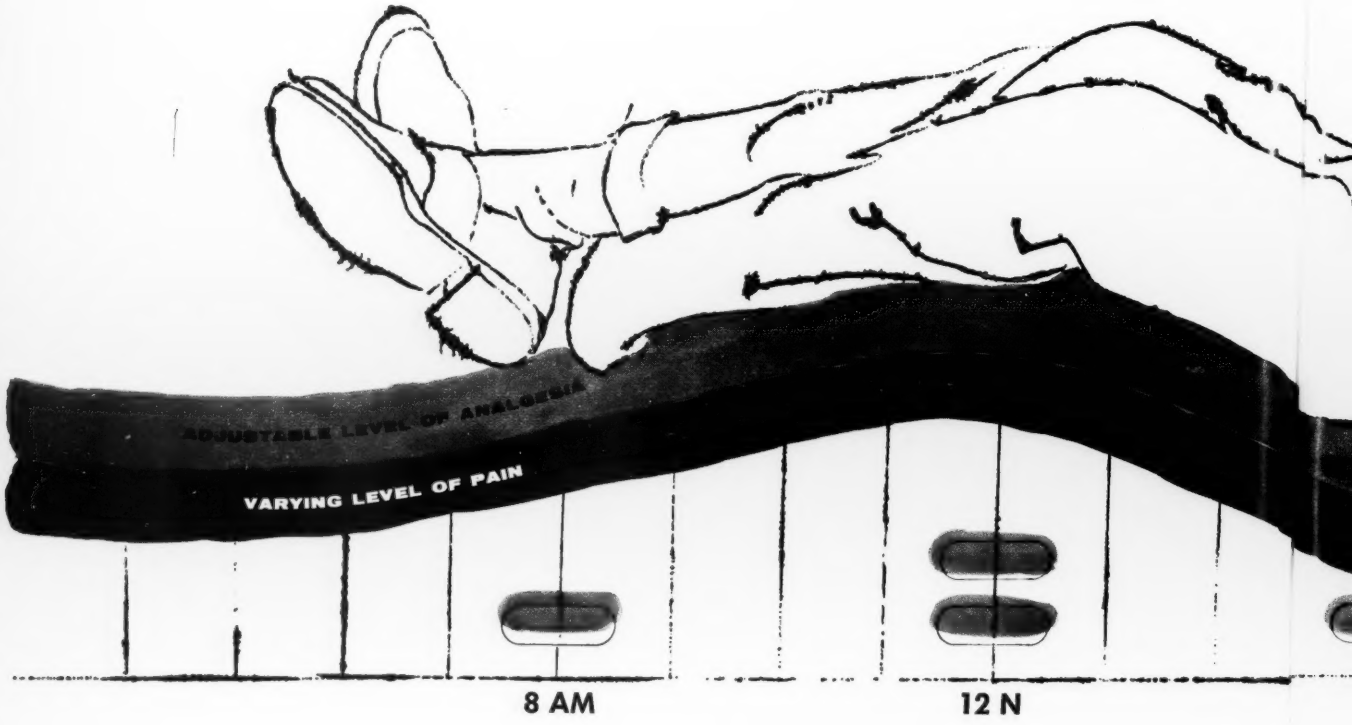
REFERENCES: 1. Adams, J.: Advantages of combined tetracycline-oleandomycin therapy in common infections, J. Tennessee M. Assoc. *50*:446 (Nov.) 1957. 2. Andersson, B.: Pulmonary abscess cured with antibiotics, Opuscula Medica, *2*:8 (Oct.) 1957. 3. Anello, V. J., and Gerschenfeld, D. S.: Staphylococcal septicemia in a child: Treatment with a combination of oleandomycin and tetracycline, Dia med., B. Air. *30*:1921 (July 28) 1958. 4. Arneil, G. C.: Tetracycline-oleandomycin treatment of acute respiratory disease in childhood, paper read at Sixth Annual Symposium on Antibiotics, Washington, D. C., October 1958, to be published. 5. Arrigoni, G.; Grignani, G. C., and Varesi, M.: A new antibiotic association in the treatment of urologic infections, Minerva med. *48*:2701 (Aug. 25) 1957. 6. Baccaredda Boy, A., and Cappelli, F.: Clinical study of the activity of a new antibiotic preparation, Signemycin, in skin conditions of infectious (pyogenous) origin, Minerva med. *48*:2690 (Aug. 25) 1957. 7. Bergdahl, L.: Clinical experiences with a so-called broad-spectrum antibiotic, Signemycin, Svenska Lakartidningen *55*:1715, 1958. 8. Blundi, E.: Use of Signemycin in a chest clinic, to be published. 9. Bolmgren, C.: Preliminary results of the use of Signemycin in certain otorhinolaryngological infections due to pyogenic organisms, Minerva med. *48*:2693 (Aug. 25) 1957. 10. Brodhage, H.: Bakteriologische in-vitro-versuche mit einer kombination von tetracyclin und oleandomycin (Signemycin), Praxis *26*:579, 1957. 11. Calvi, A.: Antibiotics in the therapy of influenza and its pulmonary complications, to be published. 12. Carter, C. H., and Maley, M. C.: Application of tetracycline-oleandomycin in clinical practice, Antibiotics Annual 1956-57, New York, Medical Encyclopedia, Inc., 1957, p. 51. 13. Castellanos, A.: Signemycin in pediatrics, to be published. 14. Chiappara, P.: A case of sepsis with multiple osteomyelitis treated with a new antibiotic, Minerva med. *48*:2697 (Aug. 25) 1957. 15. Chiarenza, A.: Observations on the effects of Signemycin in nongonococcic urethritis, Minerva med. *48*:2692 (Aug. 25) 1957. 16. Cimmino, A.; Boni, A., and Orsi, S.: Antibiotic activity of oleandomycin-tetracycline combination; *in vitro* study on 332 strains of *Micrococcus pyogenes* var. *aureus* clinically isolated, Antibiotics Annual 1957-1958, New York, Medical Encyclopedia, Inc., 1958, pp. 708-715. 17. Cooper, J.; Sprogis, G. R.; Heimemann, M., and Feiter, G. M.: Therapy of amebiasis carriers with oleandomycin-tetracycline (Signemycin), Antibiotic M. *5*:302 (May) 1958. 18. Cornbleet, T., and Epstein, B. Z.: Use of oleandomycin-tetracycline (Signemycin) for acne, Antibiotic M. *4*:598 (Oct.) 1957. 19. Cupples, J. F. B., and Perry, A. W.: Acute staphylococcal endocarditis treated with tetracycline-oleandomycin successfully, Canad. M. Assoc. J. *77*:699 (Oct.) 1957. 20. Davis, W. G.: Report on tetracycline and oleandomycin used in combination, Clinical Review & Research Notes, *1*:21-23 (April) 1958. 21. DeRomana, J.; Zaldivar, C., and Fabione, F.: Actual therapeutic conduct in the treatment of osteomyelitis, paper read at Sixth Annual Symposium on Antibiotics, Washington, D. C., Oct. 1958, to be published. 22. Durrien, C. A.; Rodriguez, J. B., and Petrella, E.: The use of oleandomycin-tetracycline in buccal surgery, paper read at Sixth Annual Symposium on Antibiotics, Washington, D. C., Oct. 1958, to be published. 23. English, A. R.; McBride, T. J.; Van Hulsema, G., and Calvert, M.: Biologic studies on PA-775, a combination of tetracycline and oleandomycin with synergistic activity, Antib. & Chemo. *6*:514-525 (Aug.) 1956. 24. Farah, L.: Some therapeutic indications of Signemycin, Medicina, Mex. *18*:519 (Nov.) 1957. 25. Faz Tabio, H.: Severe enteroseptis treated with Signemycin, Rev. cubana pediat. *29*:3 (May) 1957. 26. Faz Tabio, H.: Signemycin in the treatment of certain diseases of the respiratory tract, Rev. cubana pediat., *30*:219 (Apr.) 1958. 27. Febles, D., and Biderman, L.: Antibiotic management of acute infections in the obstetric patient, paper read at Sixth Annual Symposium on Antibiotics, Washington, D. C., Oct. 1958, to be published. 28. Felder, J.: Signemycin in der padiatrie, Schweiz. med. Wschr. *88*:953 (Sept. 27) 1958. 29. Fiora, F., and Compa, F.: The combination antibiotic oleandomycin-tetracycline (Signemycin) in acute blennorrhagia, Dia med. B. Air. *30*:570 (Apr. 3) 1958. 30. Florio, I., and Scoppetta, F. P.: Stenamicina ed occlusione intestinale sperimentale, Bulletin med. & surg. soc., Pavia, *71*:3, 1957. 31. Foradori, M.: A case of meningitis due to *Staphylococcus aureus* complicating tubercular meningitis, treated successfully with Signemycin, Minerva med. *48*:2707 (Aug. 25) 1957. 32. Frank, L., and Strother, C.: Newer antibiotics in the treatment of acne, Antibiotic M. *4*:419 (July) 1957. 33. Friedrich, K., and Hammerl, H.: A new treatment for bacterial infection with an antibiotic combination, to be published. 34. Gemma, G. B.; Mel, C., and Bachi, V.: First experiences with Signemycin in surgical infections, Minerva med. *48*:2643 (Aug. 25) 1957. 35. Giller, E. W.: Clinical appraisal of tetracycline and oleandomycin used in combination, to be published. 36. Hagan, H., and Scheffler, H.: Preliminary clinical experience with oleandomycin and the double-spectrum antibiotic, Signemycin, Medizinische, *14*:477 (Apr. 6) 1957. 37. Harris, H. J.: Tetracycline and oleandomycin (Signemycin) in chronic brucellosis, to be published. 38. Hasenclever, H. F.: Comparative *in vitro* studies of hospital strains of *Staphylococcus aureus* with oleandomycin, tetracycline and an oleandomycin-tetracycline mixture, Antibiotic M. *5*:14-25 (Jan.) 1958. 39. Hegglin, R.: Ornithosis, Schweiz. med. Wschnschr. *1*:64, 1958. 40. Henne, H. F.: Clinical experiences with the double-spectrum antibiotic Signemycin, Med. Klin., Berl., *29*:1267-1270 (July 18) 1958. 41. Heredia Diaz, J.; Saavedra Zavaleta, G.; Robles, M. A., and Aguilar, D. L.: Tetracycline-oleandomycin (Signemycin) in the treatment of puerperal infections, Medicina, Mex. *18*:308, 1958. 42. Hoffmann, H.: Clinical experiences with the broad-spectrum antibiotic, Signemycin, Medizinische, *45*:1850 (Nov. 8) 1958. 43. Hoz Tabra, J.: Preliminary results of a clinical trial with Signemycin, Rev. clin. espan. *67*:101 (Oct. 31) 1957. 44. Kaiser, J. A.; Mazzarino, C.; Baiocchi, E. M., and Phan, S. Y.: Oleandomycin-tetracycline: Toxicity in experimental animals, Antibiotics & Chemother. *7*:255-259 (May) 1957. 45. Kanee, B., and Cockcroft, W. H.: Clinical and bacteriological studies on Signemycin (oleandomycin-tetracycline) ointment, Canad. M. Assoc. J. *78*:614 (Apr. 15) 1958. 46. Keil, P. G.; Tieszen, R. L., and Solomon, R. J.: An evaluation of Signemycin in the treatment of pneumonia, to be published. 47. Klovstad, O.: Signemycin "Pfizer" a combination of oleandomycin and tetracycline, Tidsskr. norske laegefor. *15*:681 (Aug.) 1957. 48. Kohler, H. F.: Case report of the month: chronic osteomyelitis, Clinical Review & Research Notes, *1*:36 (Apr.) 1958. 49. Kraljevic, R., et al.: Investigation of the therapeutic value of the combination of tetracycline and oleandomycin, Antibiotic M. *5*:363-371 (June) 1958. 50. Kraljevic, R.: Discussion of the paper by Florentin and Sison (The role of antibiotics in Asian Influenza), Antibiotics Annual 1957-1958, New York, Medical Encyclopedia, Inc., 1958, p. 948. 51. Kraljevic, R.; Pearson, F., and Borgano, J. M.: Combined oleandomycin-tetracycline therapy in respiratory tract and other infections, to be published. 52. LaCaille, R. A., and Priest, A.: Combinations of oleandomycin with oxytetracycline and tetracycline in soft-tissue infections, Antibiotics Annual 1956-1957, New York, Medical Encyclopedia, Inc., 1957, p. 67. 53. Levi, W. M., and Kredel, F. E.: A clinical trial of Signemycin, South Carolina M. J. *54*:178 (May) 1957. 54. Lewis, H. M.; Frumess, G. M., and Henschel, E. J.: Treatment of skin infections with tetracycline and oleandomycin, Rocky Mountain M. J. *54*:806 (Aug.) 1957. 55. Lopez, A. V., and Cohen, H. J.: The clinical trial of a combination of tetracycline hydrochloride and oleandomycin (oral suspension) in the treatment of severe pulmonary infections in children, to be published. 56. Loughlin, E. H., and Mullin, W. G.: Combined antibiotic therapy of tropical infections with Matradorra and Signemycin, Antibiotics Annual 1957-58, New York, Medical Encyclopedia, Inc., 1958, p. 698. 57. Loughlin, E. H., and Mullin, W. G.: Combined antibiotic therapy of tropical infections with PA-765 and PA-775, Antibiotics Annual

More than 90 clinical references attest to the superiority and effectiveness of Cosa-Signemycin (Signemycin). Professional information booklet available on request.

Pfizer *Science for the world's well-being*

1956-57, New York, Medical Encyclopedia, Inc., 1957, p. 63. 58. McCloud, L. C.; Shidal, W., and Mulligan, J. L.: Clinical observations on infections treated with a combination of tetracycline and oleandomycin, to be published. 59. McFadden, H. W., and Schelhart, D.: Comparison of the in vivo sensitivity of micrococci to oleandomycin, tetracycline and a combination of oleandomycin and tetracycline. Antibiotics Annual 1957-1958, New York, Medical Encyclopedia, Inc., 1958, pp. 513-519. 60. Mathéa, G., and Gasparetto, A.: The first clinical experience with water-soluble Signemycin. University of Padua, Minerva chirurgica *13*:535 (May 15) 1958. 61. Medina Morales, F.: The combination of tetracycline-oleandomycin (Signemycin) in the postoperative treatment of three cases of pulmonary resection, Medicina, Mex. *809*:347, 1958. 62. Mehra, B. K.: Combating the resistant staphylococci. Current Med. Pract. *1*:326-328 (May) 1957. 63. Mendiola, R.; Saranjo, R., and Briseno, F.: New contributions to the treatment of tuberculosis, Medicina, Mex. *37*:269 (June 25) 1957. 64. Mendoza Diez, J.: Treatment of osteomyelitis with Signemycin, Thesis, Universidad Nacional Mayor de San Marcos, Facultad de Medicina, Lima, Peru, 1957. 65. Mogigian, G.: Preliminary results of a new antibiotic association in obstetrics and gynecology, Minerva med. *48*:2648 (Aug. 25) 1957. 66. Molinelli, E. A.; Vera Barros, E., and Iturraide, D.: Tetracycline-oleandomycin in human brucellosis therapy, Antibiotics Annual 1957-58, New York, Medical Encyclopedia, Inc., 1958, pp. 665-697. 67. Montilli, G., and Avellino, M.: Esperienze con una nuova associazione di antibiotici (tetraciclina ed oleandomicina) in terapia dermatologica, Dermatologia *2*:3, 1958. 68. Morador, J. L., and Morador, S.: Cause, prevention and treatment of staphylococcal infection in hospitals, paper read at Sixth Annual Symposium on Antibiotics, Washington, D. C., Oct. 1958, to be published. 69. Morador, J. L., and Tate, L. S.: Treatment of 52 cases of infections caused by coagulase-positive staphylococci with a combination of oleandomycin and tetracycline, Antibiotics Annual 1957-58, New York, Medical Encyclopedia, Inc., 1958, pp. 702-707. 70. Morador, J. L., and Tate, L. S.: The treatment of anorectal infections with Signemycin, An. Ateneo Clin. Quirur. *7*:52 (Jan.) 1958. 71. Morel, A. S.: Surgical infections: a guide to therapy, Clinical Review & Research Notes *1*:18-21 (July) 1958. 72. Morey, G. S.: Infections in nursing babies due to *Pseudomonas aeruginosa* (*B. pyocyaneus*) alone or associated with other organisms, Rev. Hosp. nino, *72*:3, 1958. 73. Oatey, J. K.: Trial of Signemycin in nonspecific urethritis, Brit. J. Vener. Dis. *34*:38, 1958. 74. O'Herlihy, F. C.: A clinical trial with Signemycin, Medical Press (London) p. 297 (Sept. 17) 1958. 75. Olmer, J., and Casanova, P.: Therapeutic notes: Clinical trials of Signemycin in the treatment of 50 patients, Semaine hop. Paris, Vol. 34, no. 2 (Feb.) 1958. 76. Ortolenghi, C. F.; Frugeroi, E. R., and Soto Jimenez, D.: Combined antibiotic therapy in 35 cases of osteomyelitis, Bol. y trab., Soc. cir. Buenos Aires, *41*:739, 1957. 77. Pagola, J. G.; Benavides, L., and Heredia, A.: An evaluation of tetracycline-oleandomycin in the treatment of epidemic typhus, paper read at Sixth Annual Symposium on Antibiotics, Washington, D. C., Oct. 1958, to be published. 78. Pavone, M.; Anello, A., and Macaluso, M. P.: Signemycin in the therapy of infections of urinary passages, to be published. 79. Perez Villasante, G.: Postoperative treatment of the ear cavity, An. Soc. Mexico de Otorinolaringologia, No. *34*:65-175 (May-Aug.) 1957. 80. Prokop, O.: On the question of staphylococcus infections resistant to therapy, Der Praktische Arzt, *12*:145 (Feb. 15) 1958. 81. Quarti, M.: Efficacy of the association of oleandomycin and tetracycline in staphylococcal infections, Aggiornamento Pediatrico, *8*:11, 1957. 82. Quirno, N.; Fukelman, R., and Achaval, M.: Treatment with oleandomycin-tetracycline of infections observed in clinical practice, Dia med. *30*:2938 (Nov. 17) 1958. 83. Ragazzini, F.; Moges, P., and Acocella, M.: First clinical applications of Signemycin in pediatrics, Minerva ped. *48*:2667 (Aug. 25) 1957. 84. Randig, K.: Some experiences with Signemycin, Deutsches med. J. *8*:447 (Aug. 15) 1957. 85. Rebelledo, L. M., and Heredia, D. J.: Further clinical studies of an association of tetracycline and oleandomycin in the treatment of various infections, paper read at Sixth Annual Symposium on Antibiotics, Washington, D. C., Oct. 1958, to be published. 86. Rentschnick, P.: A combination of broad-spectrum antibiotics, Medicine et Hygiene, *429*:562 (Nov. 30) 1957. 87. Revelli, E., and Durando, C.: Treatment of the nonspecific inflammatory component of tuberculosis of the female genital organs, Minerva med. *48*:2658 (Aug. 25) 1957. 88. Rivera, J. A.; Braine, R. E., and Osborne, D.: Sensitivity of *Micrococcus pyogenes* from burned patients to the action of oleandomycin. The emergence of resistance to this antibiotic, paper read at Sixth Annual Symposium on Antibiotics, Washington, D. C., Oct. 1958, to be published. 89. Rondanelli, E. G.: The therapeutic problem of orchitis by parotitic virus, Institute of General Clinical Medicine and Medical Therapy of the University of Pavia, Bulletin med. & surg. soc., Pavia, *71*:1, 1957. 90. Saavedra Amaro, S., and Lopez Zepeda, I.: Comprobacion clinica de la Signemycin en el tratamiento de infecciones diversas, to be published in Medicina, Mex. 91. Sanchez Creus, P.: Los antibioticos de indicaciones limitadas, Rev. clin. espan. *69*:178 (June 30) 1958. 92. Sanguinolo, F.: Therapeutic action of the tetracycline-oleandomycin (Signemycin) association, Minerva med. *48*:2679 (Aug. 25) 1957. 93. Santas, A. A.; Gamora, H. M., and Brea, C. M.: Antibiotic prophylaxis in thoracic surgery, paper read at Sixth Annual Symposium on Antibiotics, Washington, D. C., Oct. 1958, to be published. 94. Schenone, H.: Genitourinary infections treated with the antibiotic combination tetracycline and oleandomycin, paper read at Sixth Annual Symposium on Antibiotics, Washington, D. C., Oct. 1958, to be published. 95. Shubin, H.: Clinical evaluation of combined chemotherapy, oleandomycin and tetracycline, Antibiotic M. *4*:174 (March) 1957. 96. Signer, A., and Vinci, G. G.: Signemycin in the healing of wounds, Arch. Societa Med-Chirurg. Messina, Vol. II, 1957. 97. Smazal, S. F., and Crowley, P. J.: Routine use of the antibiotics tetracycline and oleandomycin in combination for the treatment of infections represented in an unselected series of general office patients, to be published. 98. Steinman, E.: Trial of an antibiotic combination as a routine agent for treatment of infections in office practice, to be published. 99. Stritzler, C., and Frank, L.: Significance of the response of acne vulgaris to antibiotics, Antibiotic M. *5*:109 (Feb.) 1958. 100. Talbot, J. R.: Experience with an antibiotic combination tetracycline-oleandomycin) used routinely for anti-infective therapy in an office practice, Wisconsin M. J. *57*:237-238 (June) 1958. 101. Tato, J. M.; Galli, L. A.; Rechniewski, C.; Araaz, S.; Games, J.; Bello, J.; de Sebastian, G., and Bergaglio, O.: Treatment of chronic sinusitis with a combination of oleandomycin and tetracycline, Antibiotics Annual 1957-1958, New York, Medical Encyclopedia, Inc., 1958, p. 675. 102. Willcox, R. R.: Tetracycline and oleandomycin in combination in nongonococcal urethritis, Antibiotics Annual 1957-58, New York, Medical Encyclopedia, Inc., 1958, p. 672. 103. Willcox, R. R.: The treatment of nongonococcal urethritis with tetracycline and oleandomycin in combination (Signemycin), Medical Press (London) (Dec. 11) 1957. 104. Willemot, J. P., et al.: Signemycin in the treatment of pulmonary infections, Bruxelles med. *38*:1026 (June 22) 1958. 105. Winton, S. S., and Chesrow, E. J.: A clinical study of combined chemotherapy, Antibiotics Annual 1956-57, New York, Medical Encyclopedia, Inc., 1957, p. 55. 106. Wittmoser, R.: Hospitalismus, Chirurgische Praxis, *4*:281 (Sept.) 1957. 107. Zaldivar, C. G., and Falcone, E.: Preliminary results in osteomyelitis with tetracycline and the phosphate of oleandomycin (Signemycin), Rev. Hosp. nino *18*:151 (June) 1957. 108. Zaldivar, C. G.: Complicated forms of chronic osteomyelitis, Rev. Hosp. nino *72*:315 (Dec.) 1957.

PFIZER LABORATORIES, Division, Chas. Pfizer & Co., Inc., Brooklyn 6, N. Y.



keep all patients* pain-free at all times

- with the proper potency to match pain intensity
- with dosage flexibility to match pain variations

Phenaphen®

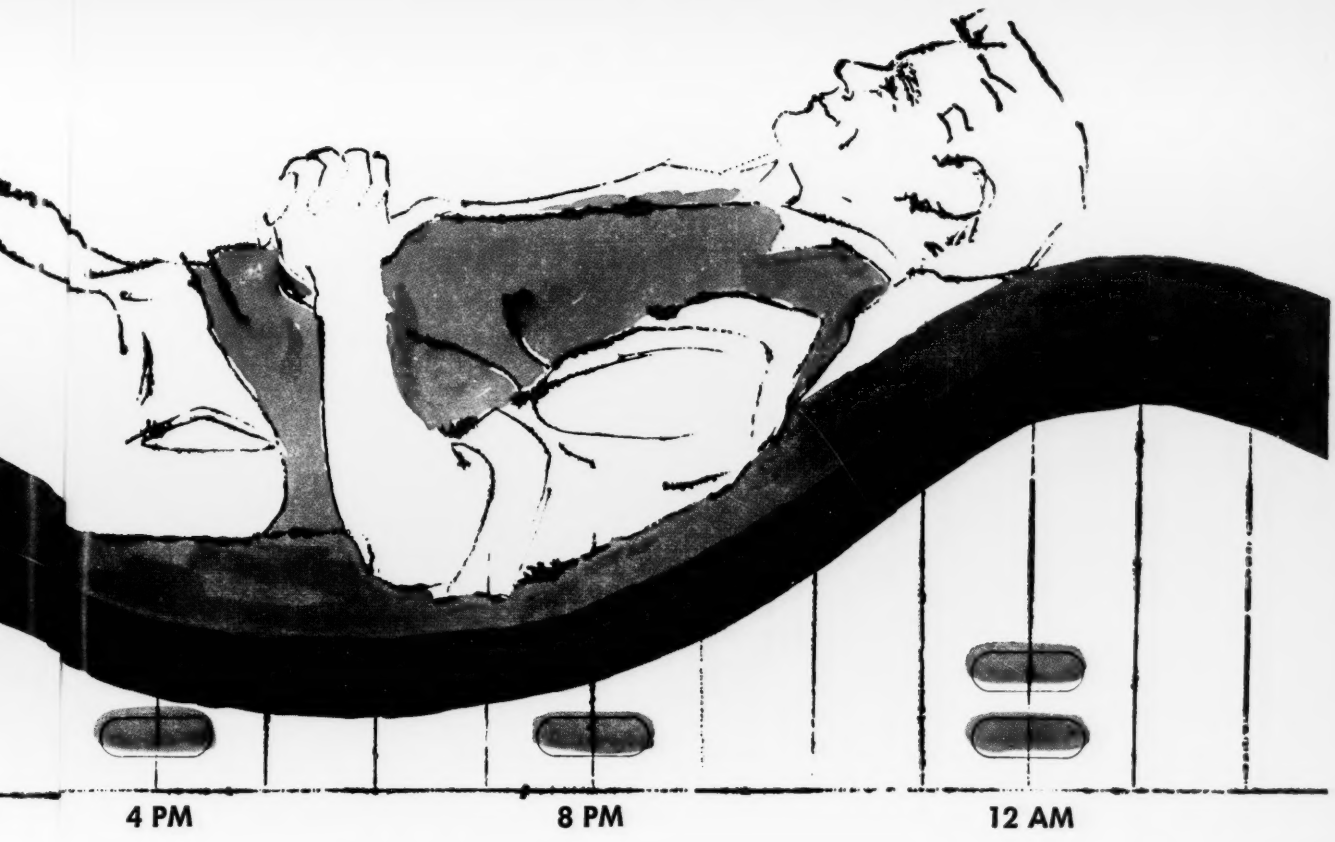
or

Phenaphen® with Codeine

*except those for whom recourse to morphine is inescapable.

Robins A. H. ROBINS CO., INC., RICHMOND 20, VIRGINIA

Ethical Pharmaceuticals of Merit since 1878



Phenaphen and Phenaphen with Codeine provide
a wide range of analgesia, plus complete dosage flexibility,
to match varying pain requirements.

Yours to prescribe:

The **right** dose of the **right** potency at the **right** time.

Phenaphen

Basic non-narcotic formula

For mild to moderate pain

Each capsule contains:

Phenacetin (3 gr.) .....194.0 mg.
Acetylsalicylic acid (2½ gr.).....162.0 mg.
Phenobarbital (¼ gr.) ..... 16.2 mg.
Hyoscyamine sulfate.....0.031 mg.

Phenaphen No. 2

Phenaphen with Codeine Phosphate ¼ gr. (16.2 mg.)

For moderate to severe pain

Phenaphen No. 3

Phenaphen with Codeine Phosphate ½ gr. (32.4 mg.)

For severe or stubborn pain

Phenaphen No. 4

Phenaphen with Codeine Phosphate 1 gr. (64.8 mg.)

For stubborn or intense pain—to obviate or postpone use of morphine or addicting synthetic narcotics

DOSAGE: One or two capsules as required.

Now—All cold symptoms can be controlled

Provides Triaminic for more complete and more effective relief from nasal and paranasal congestion because of systemic transport to *all* respiratory membranes—without drawbacks of topical therapy.†

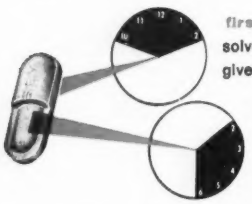
Provides well-tolerated APAP (N-acetyl-p-aminophenol) for prompt and effective analgesic and antipyretic action to make the patient more comfortable.

Provides Dormethan (brand of dextromethorphan HBr) for non-narcotic antitussive action on the cough reflex center in the medulla—as effective as codeine but without codeine's drawbacks.

Provides terpin hydrate, classic expectorant to thin inspissated mucus and help the patient clear the respiratory passages.

†Lhotka, F. M.: Illinois M. J. 112:259 (Dec.) 1957. Fabricant, N. D.: E. E. N. T. Monthly 37:460 (July) 1958. Farmer, D. F.: Clin. Med. 5:1183 (Sept.) 1958.

Special "timed release" design



first—the outer layer dissolves within minutes to give 3 to 4 hours of relief

then—the inner core releases its ingredients to sustain relief for 3 to 4 more hours

also available for those patients who prefer liquid medication: **Tussagesic suspension**

Each TUSSAGESIC tablet provides:

TRIAMINIC®	50 mg.
(phenylpropanolamine HCl	25 mg.
pheniramine maleate	12.5 mg.
pyrilamine maleate	12.5 mg.)
Dormethan (brand of dextromethorphan HBr)	30 mg.
Terpin hydrate	180 mg.
APAP (N-acetyl-p-aminophenol)	325 mg.

Dosage: One tablet in the morning, midafternoon and in the evening, if needed.

Tussagesic* *timed-release tablets*

***Contains TRIAMINIC to** STOP **running noses** **and open stuffed noses orally**

SMITH-DORSEY • a division of The Wander Company • Lincoln, Nebraska • Peterborough, Canada

newest steroid

CLINICALLY PREPROVED

maximum
steroid effectiveness in more patients

highest
anti-inflammatory activity per milligram

lowest
dosage of currently used steroids

unexcelled
freedom from significant diabetogenic effects

widest
range of steroid usefulness

Schering

today's steroid...DERONIL

dexamethasone

in rheumatoid arthritis—"highly effective...in remarkably small daily milligram doses."[1]

The initial anti-inflammatory effect of DERONIL, the most active anti-rheumatic steroid on a weight basis synthesized to date,[1-4] is observed in most patients within 24 to 48 hours. Joint pain is relieved, swelling and stiffness diminish, and range of motion increases. The patient usually feels a sense of well-being and the appetite improves. The intensified anti-inflammatory activity helps assure successful initial therapy in rheumatoid arthritic cases and frequently restores relief to patients who have shown a diminution in response to previous steroids.

TYPICAL RESULTS WITH DEXAMETHASONE THERAPY IN ARTHRITIS

Investigator or Study	No. of patients	Improvement		
		Very marked or marked	Moderate	Slight or inadequate
Boland, E. W., and Headley, N. E.[1]	11	4	5	2
Bunim, J. J., and others[3]	18	5	7	6
Series A[5]	15	4	9	2
Series B[5]	6	6	—	—
Series C[5]	3	3	—	—

DERONIL IN BRONCHIAL ASTHMA AND SEVERE RESPIRATORY ALLERGIES

Investigator or Study	No. of patients	Results		
		Excellent	Fair to good	Poor
Series D[5]	24	10	9	5
Series E[5]	12	8	3	1
Series F[5]	20	13	4	3

clinically preproved in steroid-responsive diseases

IMPROVEMENT WITH DERONIL IN A WIDE VARIETY OF ALLERGIC AND INFLAMMATORY SKIN DISEASES[5]

Disease	No. of patients	Improved	Same	Worse
Seborrheic psoriasis	1	1		
Neurodermatitis	5	5		
Allergic dermatitis	5	5		
Psoriasis	5	2	1	2
Lupus erythematosus, chronic discoid	1		1	
Atopic dermatitis	3	3		
Acne rosacea	1		1	
Nummular eczema	2	2		
"id" reactions	2	2		
Contact dermatitis	2	2		
Pityriasis rosea, severe	1	1		
Urticaria, chronic	1	1		
Totals	29	24	3	2

THERAPY WITH DERONIL IN A VARIETY OF INFLAMMATORY EYE DISEASES[5]

Patient, age and sex	Diagnosis	Symptoms	Results with DERONIL	Side effects
A.B., 46, M.	Postoperative uveitis		Improved; treatment being continued	None reported*
A.E., 53, M.	Choroiditis	Severe choroidal involvement	Excellent; marked improvement	None*
B.F., 60, F.	Acute choroiditis	Marked visual loss and choroidal effect	Marked improvement; therapy being continued	None*
B.K., 29, F.	Chronic uveitis	Generalized involvement	No change despite dosage increase	None*
H.K., 28, M.	Acute iritis	Blurred vision	Excellent; recovered	None*
A.P., 52, M.	Uveitis and perivasculitis	Vision loss to 20/80	Marked improvement; vision 20/30; treatment continued	None*
A.S., 34, M.	Uveitis		Excellent; patient recovered	None*

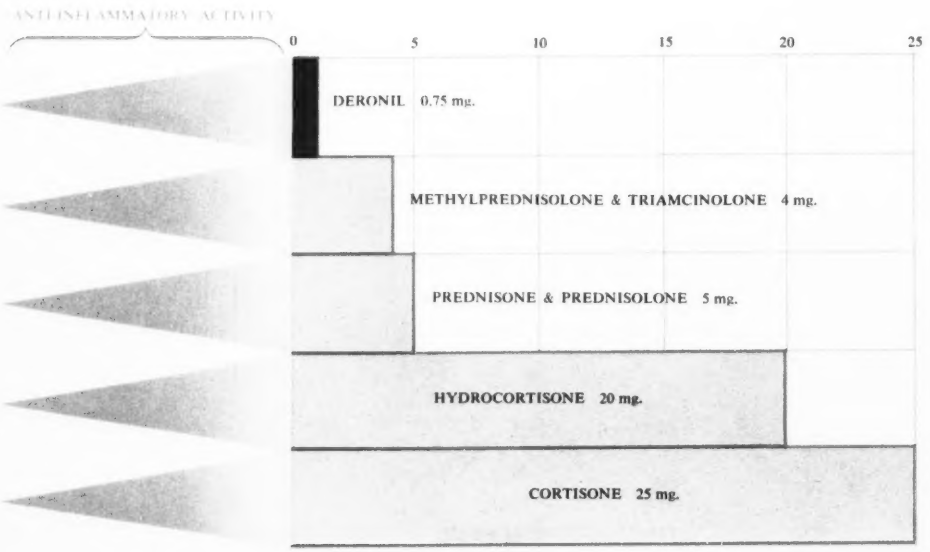
*Short-term therapy (AMA 12/30)

guide to the clinical use of new DERONIL

dexamethasone

DERONIL, new 9-alpha-fluoro-16-alpha-methyl derivative of prednisolone, has at least six times the anti-inflammatory activity, milligram for milligram, of other steroids in current use. Effective dosages are the lowest in steroid therapy. And the price of DERONIL to the patient is no higher than those prevailing for other steroids.

STEROID DOSAGE EQUIVALENTS OF DERONIL



Comparative dosages of corticosteroids for equivalent anti-inflammatory activity

Dosages pre-established in the vast majority of steroid-responsive diseases

The comprehensive clinical studies conducted with DERONIL before introduction mean that initial and maintenance dosages are already established for the physician in practically all steroid-responsive diseases including rheumatoid arthritis, acute rheumatic fever, bursitis, bronchial asthma, pulmonary emphysema and fibrosis, intractable hay fever (pollenosis), disseminated lupus erythematosus, allergic and inflammatory dermatoses and eye diseases and the adrenogenital syndrome. For complete information on dosage, precautions and contraindications, consult Schering literature.

Packaging

DERONIL Tablets, 0.75 mg., scored, bottles of 50 and 500.

Bibliography

(1) Boland, E. W., and Headley, N. E.: Preliminary clinical observations with a new series of synthetic corticosteroid compounds in patients with rheumatoid arthritis, Paper presented at Annual Meet., Am. Rheumat. Assn., San Francisco, June 21, 1958. (2) Boland, E. W.: California Med. *88*:417, 1958. (3) Bunim, J. J., and others: Arthritis and Rheumatism *1*:313, 1958. (4) Spies, T. D.; Stone, R. E., and Niedermeier, W.: South. M. J. *51*:1066, 1958. (5) Reports to Clinical Research Division, Schering Corporation.

DERONIL – T.M. – brand of dexamethasone.

SCHERING CORPORATION · BLOOMFIELD, NEW JERSEY Schering

DR-J 1029

If one . . . or all . . . needs nutritional support . . .

they
deserve

GEVRAL®

capsules—14 VITAMINS AND 11 MINERALS

Vitamin-Mineral Supplement Lederle

For Complete Formula see PDR (Physicians' Desk Reference), page 689

LEDERLE LABORATORIES, a Division of AMERICAN CYANAMID COMPANY, Pearl River, New York

Lederle

more than tetracycline alone

MYSTECLIN-V CONTAINS TETRACYCLINE PHOSPHATE COMPLEX FOR A DIRECT ATTACK ON THE PRIMARY INFECTION

Mysteclin-V strikes directly at all tetracycline sensitive organisms — most pathogenic bacteria, certain large viruses, Endamoeba histolytica. It provides all benefits of tetracycline in the effective phosphate complex form.[1] Patient response is rapid because initial high peak blood serum levels may be maintained easily at the antibacterial attack level until the infection is conquered.

MYSTECLIN-V CONTAINS MYCOSTATIN FOR A SPECIFIC DEFENSE AGAINST SECONDARY MONILIAL SUPERINFECTION

Mysteclin-V protects patients against antibiotic induced intestinal moniliasis and its complications, including vaginal and anogenital moniliasis. This protection is provided by Mycostatin, the antifungal antibiotic, with specific action against Candida (Monilia) albicans.[2]

BOTH ARE OFTEN NEEDED WHEN BACTERIAL INFECTION OCCURS

MYSTECLIN-V

SQUIBB TETRACYCLINE PHOSPHATE COMPLEX (SUMYCIN) AND NYSTATIN (MYCOSTATIN)

Capsules (250 mg./250,000 u), bottles of 16 and 100.
Half-strength Capsules (125 mg./125,000 u), bottles of 16 and 100.
Suspension (125 mg./125,000 u per 5 cc.), 2 oz. bottles.
Pediatric Drops (100 mg./100,000 u per cc.), 10 cc. dropper bottles.

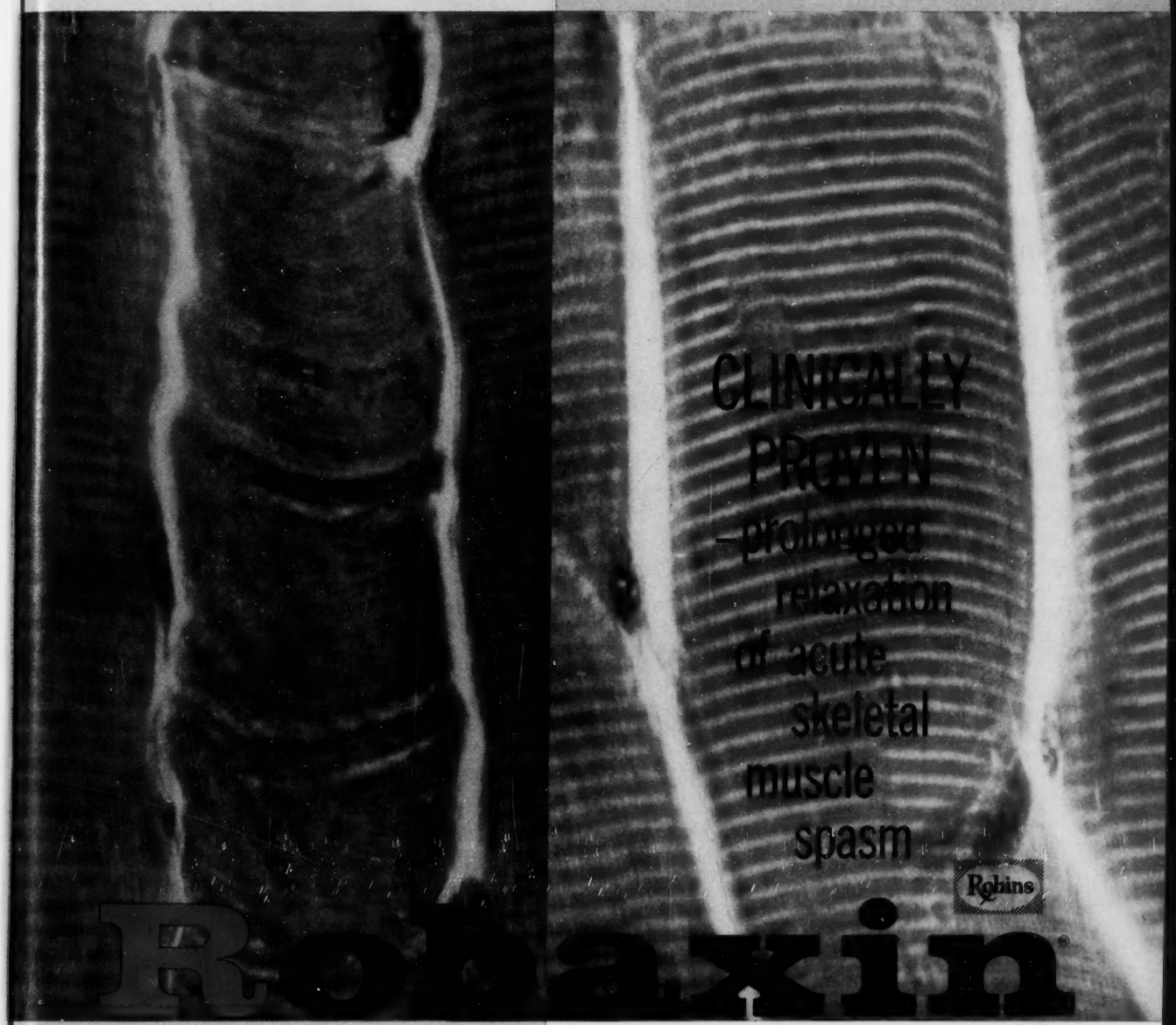
References: 1. Crunk, G. A.; Naumann, D. E., and Casson, K.: Antibiotics Annual 1957-1958, New York, Medical Encyclopedia Inc. 1958, p. 397. 2. Newcomer, V. D.; Wright, E. T., and Sternberg, T. H.: Antibiotics Annual 1954-1955, New York, Medical Encyclopedia Inc., 1955, p. 686.

SQUIBB Squibb Quality—the Priceless Ingredient

*MYSTECLIN®, *SUMYCIN®, AND *MYCOSTATIN® ARE SQUIBB TRADEMARKS

Fiber of skeletal muscle in spasm

Fiber of skeletal muscle relaxed *(photomicrographs)*



Methocarbamol Robins U.S. Pat. No. 2770649

TABLETS

Summary of six published clinical studies:

ROBAXIN BENEFICIAL IN 92.4% OF SKELETAL MUSCLE SPASM CASES

	NO. PATIENTS	RESPONSE			
		"marked"	moderate	slight	none
Carpenter[1]	33	26	6	1	—
		"pronounced"			
Forsyth[2]	58	37	20	—	1
		"good"			
Lewis[3]	38	25	6	—	7
		"excellent"			
O'Doherty & Shields[4]	17	14	2	1	0
		"significant"			
Park[5]	30	27	—	2	1
		"gratifying"			
Plumb[6]	60	55	—	—	5
TOTALS	236	184 (78.0%)	34 (14.4%)	4	14

- **Highly potent—and long acting.**[1,2,3]
- **Relatively free of adverse side effects.**[1,2,3,5,6]
- **In ordinary dosage, does not reduce muscle strength or reflex activity.**[1]

REFERENCES: 1. Carpenter, E. B.: Southern M. J. 51:627, 1958. 2. Forsyth, H. F.: J.A.M.A. 167:163, 1958. 3. Lewis, W. B.: California Med. 90:26, 1959. 4. O'Doherty, D. S., and Shields, C. D.: J.A.M.A. 167:160, 1958. 5. Park, H. W.: J.A.M.A. 167:168, 1958. 6. Plumb, C. S.: Journal-Lancet 78:531, 1958.

A. H. ROBINS CO., INC., Richmond 20, Virginia

Ethical Pharmaceuticals of Merit since 1878

Lowers blood pressure — maintains mental alertness

calms the patient under stress

Rautensin provides a smooth, gradual and sustained reduction of blood pressure without sudden rebounds or abrupt declines.[1] Rautensin's tranquilizing properties calm the tense and anxious hypertensive without impairing alertness, without producing excessive lethargy or drowsiness.

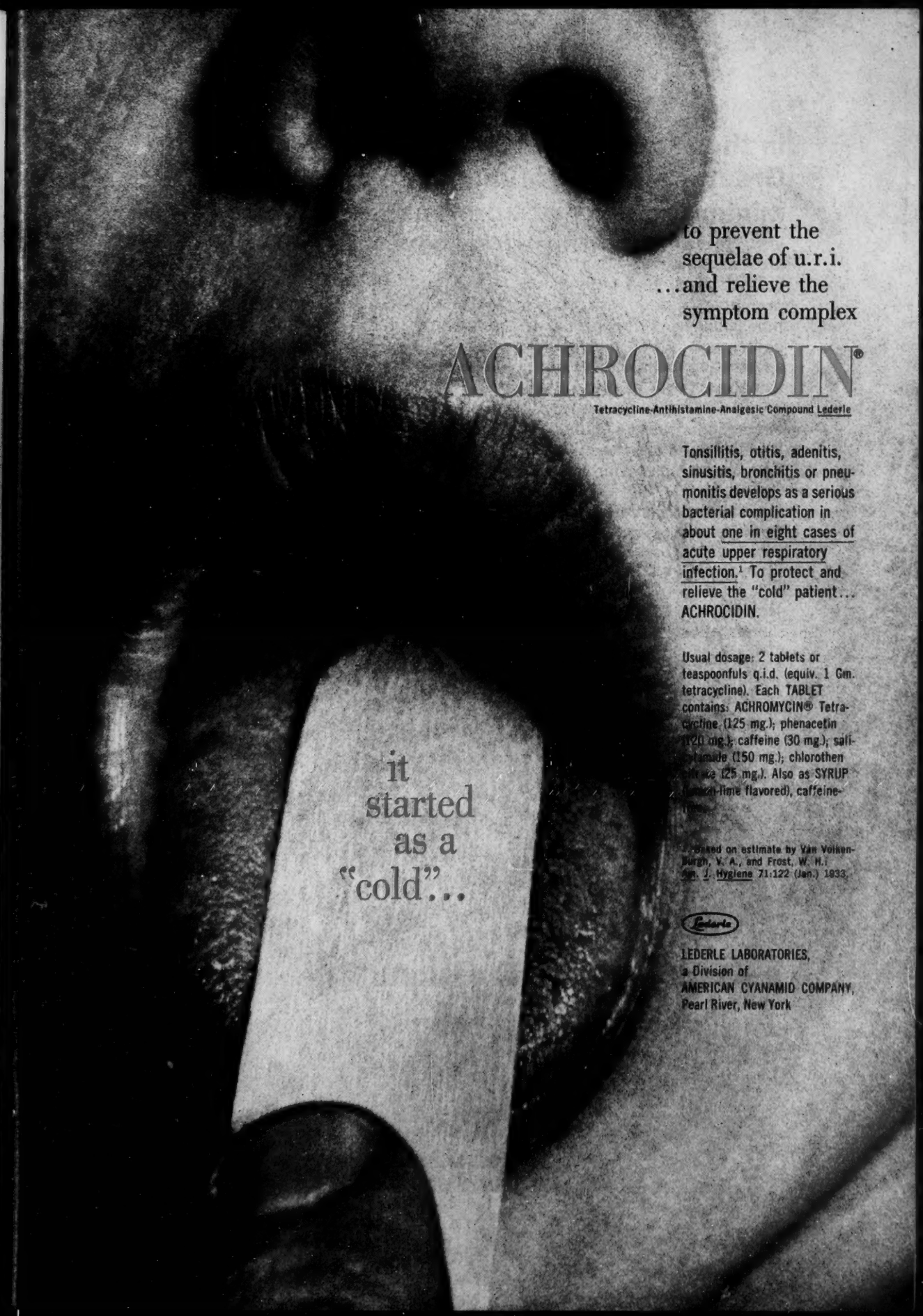
The risk of Rauwolfia-induced depression is markedly reduced since the alseroxylon fraction alone is used.[2] Even on long-term administration side actions "...are either completely absent or so mild as to be inconsequential."[3]

Rautensin®

Each tablet contains 2 mg. of the purified alseroxylon complex of Rauwolfia serpentina

1. Wright, W. T., Jr.; Pokorny, C., and Foster, T. L.: Kansas M. Soc. *57*:410, 1956. 2. Gilchrist, A. R.: Brit. M. J. *2*:1011 (Nov. 3), 1956. 3. Terman, L. A.: Illinois M. J. *3*:67, 1957.

SMITH-DORSEY • a division of The Wander Company • Lincoln, Nebraska



to prevent the sequelae of u.r.i. ...and relieve the symptom complex

ACHROCIDIN®

Tetracycline-Antihistamine-Analgesic Compound Lederle

Tonsillitis, otitis, adenitis, sinusitis, bronchitis or pneumonitis develops as a serious bacterial complication in about one in eight cases of acute upper respiratory infection.[1] To protect and relieve the "cold" patient... ACHROCIDIN.

Usual dosage: 2 tablets or teaspoonfuls q.i.d. (equiv. 1 Gm. tetracycline). Each TABLET contains: ACHROMYCIN® Tetracycline (125 mg.); phenacetin (120 mg.); caffeine (30 mg.); salicylamide (150 mg.); chlorothen citrate (25 mg.). Also as SYRUP (lemon-lime flavored), caffeine-free.

1. Based on estimate by Van Volkenburgh, V. A., and Frost, W. H.: Am. J. Hygiene 71:122 (Jan.) 1933.

Lederle

LEDERLE LABORATORIES,
a Division of
AMERICAN CYANAMID COMPANY,
Pearl River, New York

In the Treatment of Rheumatic Disorders Greater stability of maintenance dosage minimizes risks of hormonal imbalance

In Sterazolidin, the anti-inflammatory actions of prednisone and Butazolidin* are combined to permit lower effective dosage of each. Clinical experience has indicated that patients can be well maintained on this combination over prolonged periods with relatively low, stable dosage levels of each component, thus minimizing the problems arising from excessively high doses of corticosteroids. Other side effects have also been gratifyingly few. Antacid and spasmolytic components are contained in Sterazolidin capsules for the benefit of patients with gastric sensitivity.

Sterazolidin®: Each capsule contains prednisone 1.25 mg.; phenylbutazone 50 mg.; dried aluminum hydroxide gel 100 mg.; magnesium trisilicate 150 mg.; homatropine methylbromide 1.25 mg.

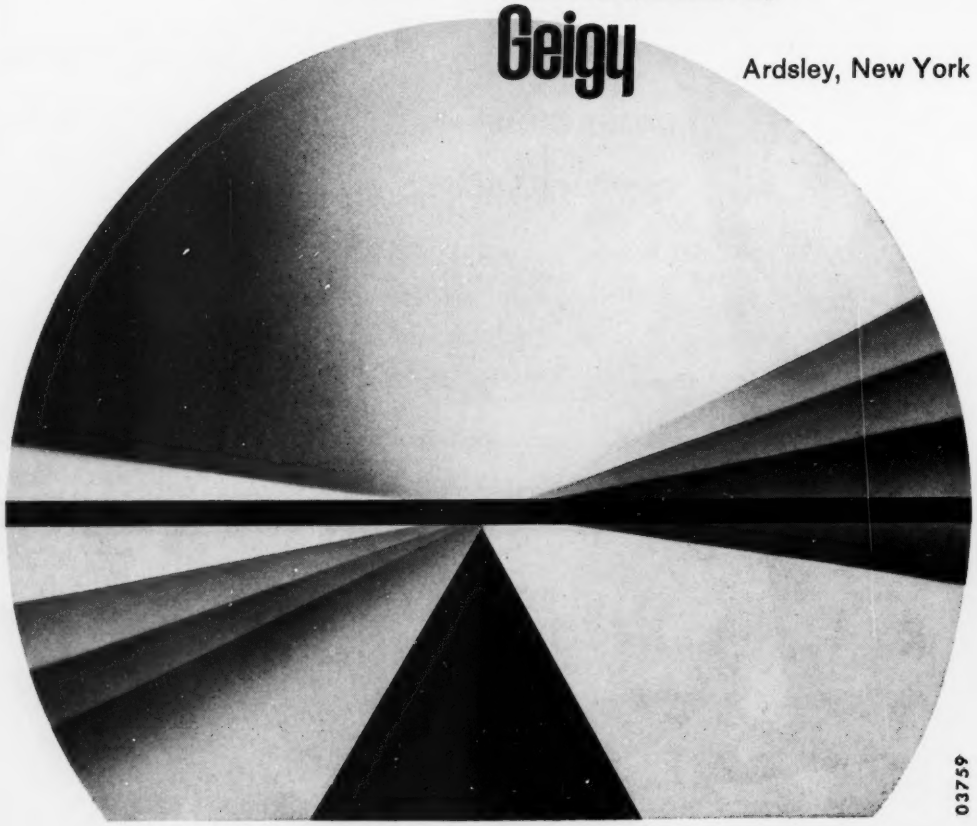
Detailed information available on request.

*Geigy's trademark for phenylbutazone—Reg. U. S. Pat. Off.

new Sterazolidin® Capsules

prednisone-phenylbutazone, Geigy

Geigy Ardsley, New York



03759

A workhorse "mycin" for common infections

respiratory infections

prompt, high blood levels

consistently reliable and reproducible blood levels

minimal adverse reactions

With well-tolerated CYCLAMYCIN, you will find it possible to control many common infections rapidly and to do so with remarkable freedom from untoward reactions. CYCLAMYCIN is indicated in numerous bacterial invasions of the respiratory system—lobar pneumonia, bronchopneumonia, tracheitis, bronchitis, and other acute infections. It has been proved effective against a wide range of organisms, such as pneumococci, H. influenzae, streptococci, and many strains of staphylococci, including some resistant to other "mycins." Supplied as Capsules, 125 and 250 mg., vials of 36; Oral Suspension, 125 mg. per 5-cc. teaspoonful, bottles of 2 fl. oz.

new

CYCLAMYCIN®

Triacetyloleandomycin, Wyeth

PHYSICIANS' COUNCIL FOR INFORMATION ON DRUG USAGE

Conforms to Code for Advertising

Wyeth®

Philadelphia 1, Pa.

1 Ladeez and gentlemen:
learn all about new VITERRA PEDIATRIC,
a good supplement
in a great new package.
2 First,
see what happens when
you push the metered plunger.
3 Aha!
An exact 0.6 cc.
comes out this spout.
Never more, never less.
4 And notice –
no drip, no waste,
no sticky bottle.
5 On your right,
see the Metered-Flow
bottle's tight seal.
No risk of
contamination.
6 Let's take a minute
to admire the formula.
7 That means
no hot-weather
loss of potency.
8 Now for a farewell treat, a
taste of delicious, orange-y
VITERRA PEDIATRIC. How will
you have it – in fruit juice?
On cereal? Straight from the
spoon?
VITERRA® PEDIATRIC
each 0.6 cc. contains:
M D R
Infants Children
A (synthetic) 5000 U.S.P. Units 333% 167%
D (Calciferol) 1000 U.S.P. Units 250% 250%
B1 (Thiamine) 1 mg. 400% 133%
B2 (Riboflavin) 1 mg. 167% 110%
B6 (Pyridoxine) 1 mg. †† ††
B12 (Cyanocobalamin) 1 mcg. †† ††
C (Ascorbic Acid) 50 mg. 500% 250%
Niacinamide 10 mg. 200% 133%
Panthenol 2 mg.
in a d-sorbitol base for better vitamin B12 absorption
††Minimum daily requirement has not been established.
DOSAGE: 0.6 cc. or as directed by physician.
In 50 cc. bottles
no refrigeration needed

VITERRA® PEDIATRIC

METERED-FLOW BOTTLE

ALLOW 30 SECONDS BETWEEN DISPENSINGS

Special note to doctors who took this tour:

Problems of over- and under-dosage, spillage, spoilage or leakage disappear with VITERRA PEDIATRIC's new Metered-Flow bottle. Why not consider these advantages when you recommend a vitamin supplement?

New York 17, N.Y.
Division, Chas. Pfizer & Co., Inc.
Science for the world's well-being

Relieve moderate or severe pain

Reduce fever

Alleviate the general malaise of upper respiratory infections

'TABLOID'

'EMPIRIN' COMPOUND

WITH

CODEINE PHOSPHATE*

maximum codeine analgesia/optimum antipyretic action

*Subject to Federal Narcotic Regulations

BURROUGHS WELLCOME & CO. (U.S.A.) INC., Tuckahoe, New York

Symbols OF PROVEN PAIN RELIEF

gr. 1

gr. ½

gr. ¼

gr. ⅛

Formulas for dependable relief...

...from moderate to severe pain complicated by tension, anxiety and restlessness.

'CODEMPIRAL'* NO. 3

Codeine Phosphate	gr. ½
Phenobarbital	gr. ¼
Acetophenetidin	gr. 2½
Aspirin (Acetylsalicylic Acid)	gr. 3½

'CODEMPIRAL'* NO. 2

Codeine Phosphate	gr. ¼
Phenobarbital	gr. ¼
Acetophenetidin	gr. 2½
Aspirin (Acetylsalicylic Acid)	gr. 3½

...from pain of muscle and joint origin, simple headache, neuralgia, and the symptoms of the common cold.

'TABLOID'

'EMPIRIN' COMPOUND®

Acetophenetidin	gr. 2½
Aspirin (Acetylsalicylic Acid)	gr. 3½
Caffeine	gr. ½

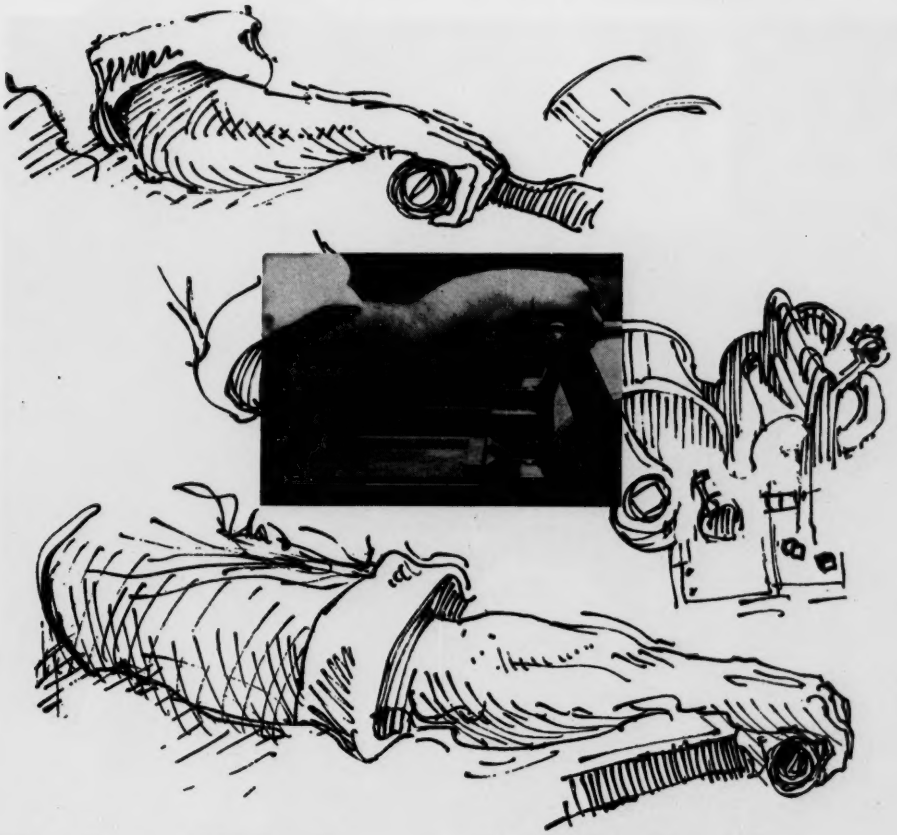
...from mild pain complicated by tension and restlessness.

'EMPIRAL'®

Phenobarbital	gr. ¼
Acetophenetidin	gr. 2½
Aspirin (Acetylsalicylic Acid)	gr. 3½

*Subject to Federal Narcotic Regulations

BURROUGHS WELLCOME & CO. (U.S.A.) INC., Tuckahoe, New York



To the relief of musculoskeletal pain, new MEDAPRIN* adds restoration of function

Analgesics offer temporary relief of musculoskeletal pain, but they merely *mask* pain rather than getting at its *cause*. New Medaprin, in addition to bringing about prompt subjective improvement, promotes the *restoration of normal function* by suppressing the inflammation that *causes* the pain.

Medaprin, Upjohn's new analgesic-steroid combination, contains aspirin plus Medrol,** the corticosteroid with *the best therapeutic ratio in the steroid field.*† Instead of suffering recurrent discomfort because of the "wearing off" of analgesics, the patient on Medaprin experiences a smooth, *extended* relief and more normal mobility.

Indications: Medaprin is indicated in mild-to-moderate rheumatic and musculoskeletal conditions, including rheumatoid arthritis, deltoid bursitis, low back pain, neuralgia, synovitis, fibromyositis, osteoarthritis, low back sprain, traumatic wrist, sciatica, and "tennis elbow."

Dosage: The recommended dosage is 1 tablet q.i.d. The usual cautions and contraindications of corticotherapy should be observed.

Supplied: In bottles of 100 and 500.

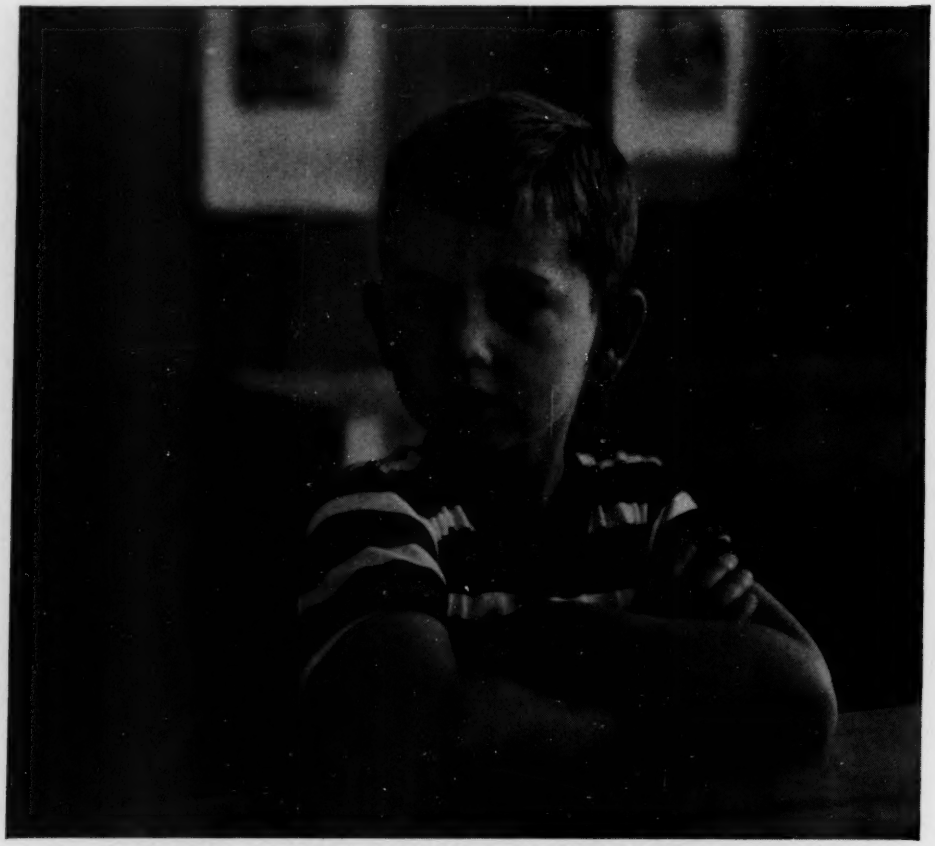
Formula: Each Medaprin tablet contains

- 300 mg. acetylsalicylic acid, for prompt relief of pain
- 1 mg. Medrol, to suppress the causative inflammation
- 200 mg. calcium carbonate, as buffer

*TRADEMARK **TRADEMARK, REG. U. S. PAT. OFF.—METHYLPREDNISOLONE, UPJOHN
†RATIO OF DESIRED EFFECTS TO UNDESIRED EFFECTS

The Upjohn Company, Kalamazoo, Michigan

Upjohn



PATIENT EXPRESSES CONFIDENCE IN DOCTOR'S COUGH MEDICINE

AN EXPRESSION OF CONFIDENCE in your therapeutic ability may be expected when you prescribe Pyribenzamine Expectorant for cough in children. A combination of 3 active agents, Pyribenzamine Expectorant with Ephedrine relieves congestion, makes breathing easier, promotes productive expectoration. And the cherry flavor is usually quite acceptable to pediatric tastes.

DOSAGE: ½ to 1 teaspoon every 3 or 4 hours.

SUPPLIED: Expectorant with Ephedrine, containing 30 mg. Pyribenzamine citrate 10 mg. ephedrine sulfate and 80 mg. ammonium chloride per 4-ml. teaspoon.

ALSO AVAILABLE: Pyribenzamine Expectorant with Codeine and Ephedrine, same formula plus 8 mg. codeine phosphate (exempt narcotic).

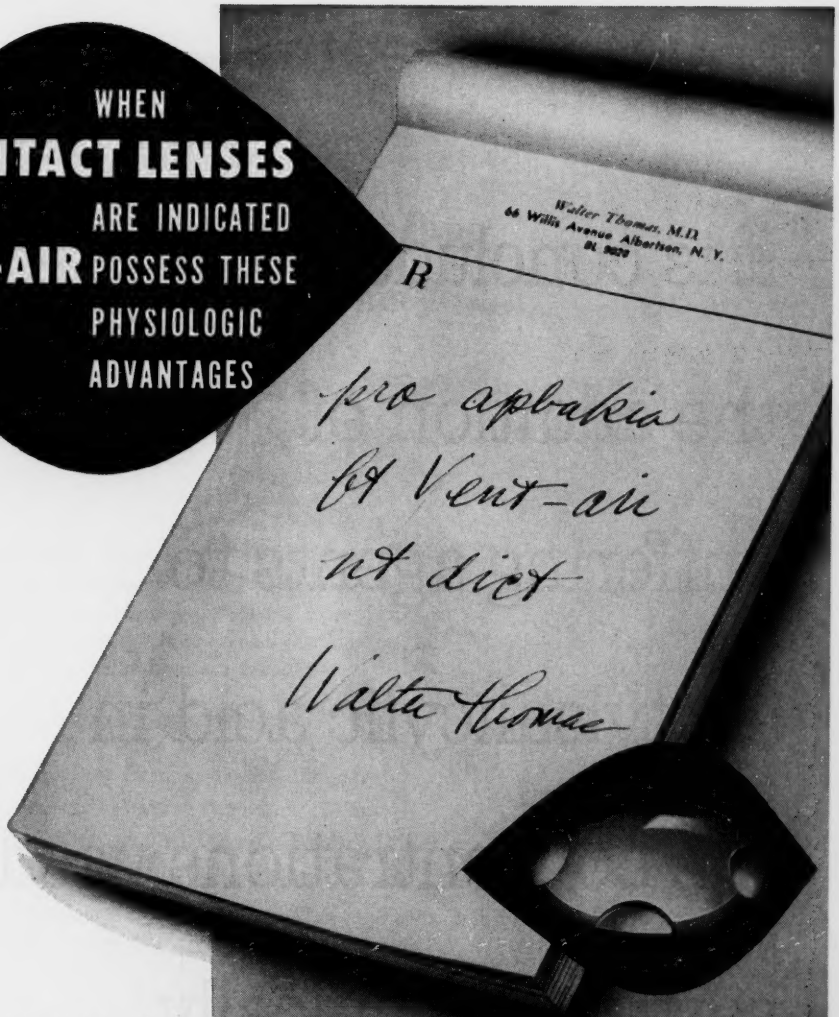
PYRIBENZAMINE® citrate (tripelennamine citrate CIBA)

2/2626MB

Pyribenzamine® Expectorant with EPHEDRINE

CIBA
SUMMIT, N. J.

WHEN
CONTACT LENSES
ARE INDICATED
VENT-AIR POSSESS THESE
PHYSIOLOGIC
ADVANTAGES



Four peripheral vents	Permit topical circulation of lacrimal and glandular secretions without excessive motility
Corneal apical clearance	Favors normal corneal metabolism and oxygenation
Ultra-Smoothness of Inner and Outer Surfaces	Avoid limbal epithelial and tarsal conjunctival exacerbation
Highly absorptive methyl-methacrylate composition	Simulates "wetting" and moisture-retention properties of cornea (of military specification)
Precision-ground	Prescriptive qualities exact to ± 0.12 D. with precise allowance for vertex refraction and lachrymal factor (exact to .02 mm radius in inner curvature)
Custom-fitted	In uni-, bi-, or tri-curve radii conforming to corneal peripheral asphericities
Hyper-thinness of edge or center	Maintains uniform thickness in high myopia or hyperopia approximating .20 mm irrespective of power
Widest range of inner radii	From 5.0 to 10.00 mm providing for extremes of keratoconic and megalogiobic dimensions
Cosmetic, pin-hole and tinted effects	For leucomatous, polyopic, iridodialytic and albinic conditions or other corneal or media anomalies.

VENT-AIR CONTACT LENS LABORATORIES · NEW YORK, N. Y.

"It is concluded that the addition of buffering agents to acetylsalicylic acid in the concentrations used serves no clinically detectable useful purpose."[1]

[1]Sadove, Max S. and Schwartz, Lester: An Evaluation of Buffered Versus Nonbuffered Acetylsalicylic Acid, Postgraduate Medicine; 24:183, August, 1958.
Nonbuffered Material Used—Bayer® Aspirin.

enables your patient to escape peptic ulcer symptoms

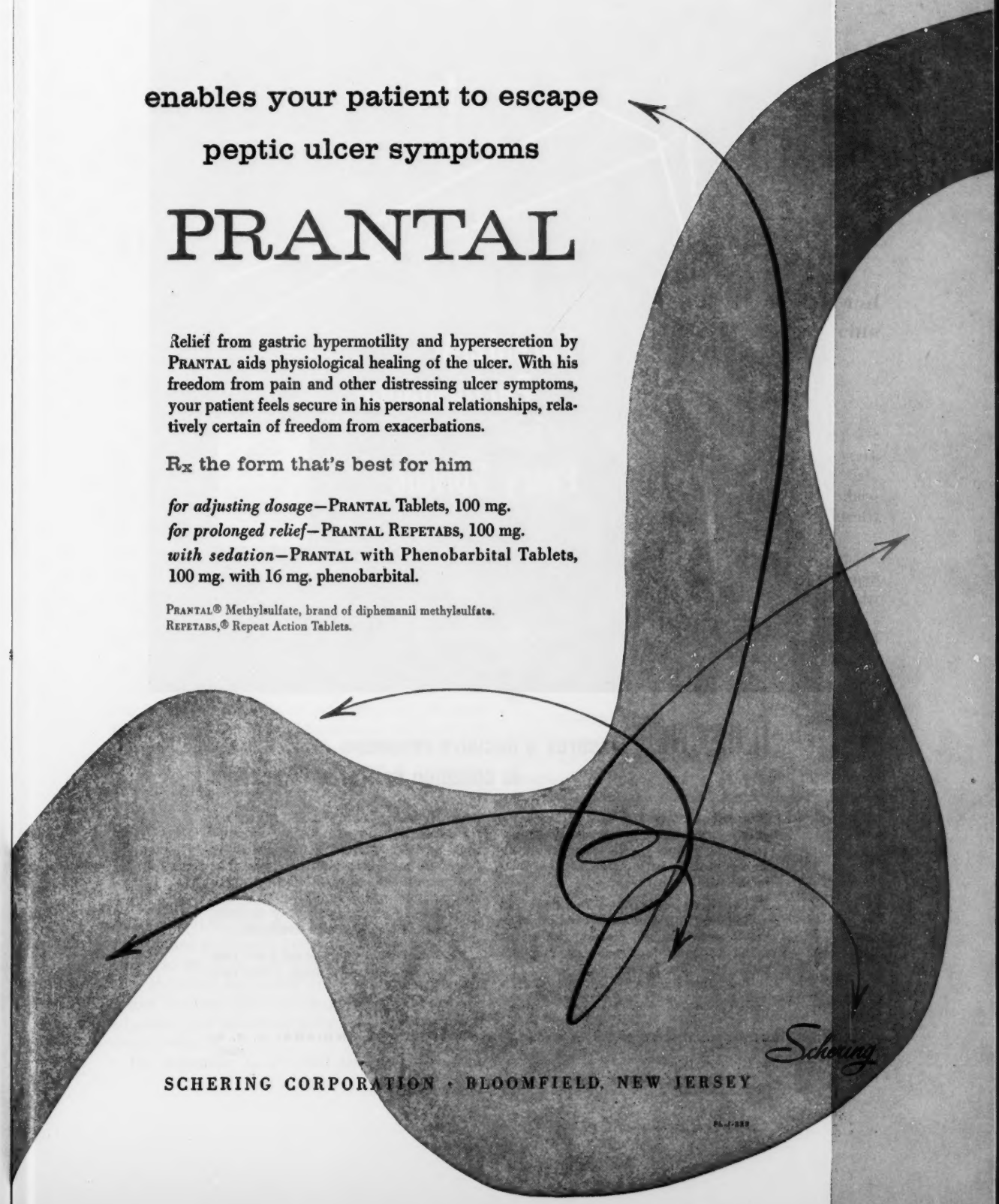
PRANTAL

Relief from gastric hypermotility and hypersecretion by PRANTAL aids physiological healing of the ulcer. With his freedom from pain and other distressing ulcer symptoms, your patient feels secure in his personal relationships, relatively certain of freedom from exacerbations.

R_x the form that's best for him

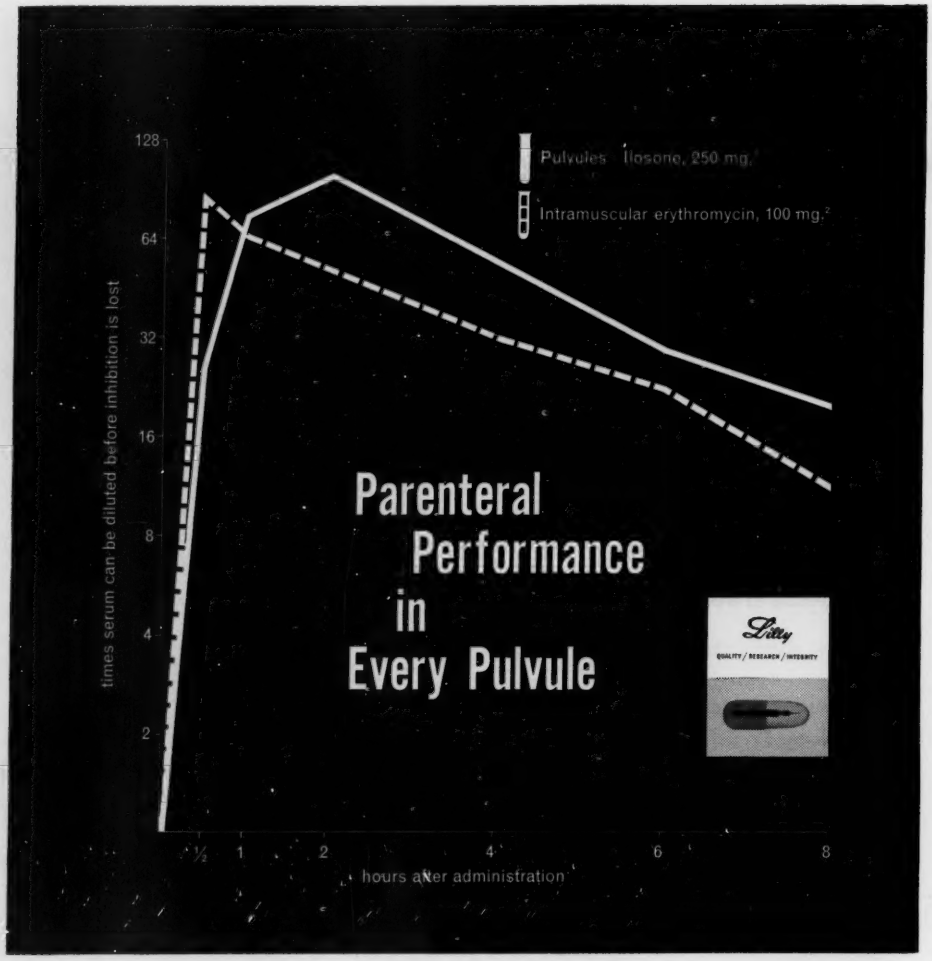
for adjusting dosage—PRANTAL Tablets, 100 mg.
for prolonged relief—PRANTAL REPETABS, 100 mg.
with sedation—PRANTAL with Phenobarbital Tablets, 100 mg. with 16 mg. phenobarbital.

PRANTAL® Methylsulfate, brand of diphemanil methylsulfate.
REPETABS,® Repeat Action Tablets.



Schering

SCHERING CORPORATION • BLOOMFIELD, NEW JERSEY



ILOSONE™ assures a decisive response in common bacterial infections

Parenteral potency—The graph above shows that Ilosone provides antibacterial serum levels comparable to those obtained with intramuscular antibiotic administration.

Parenteral certainty—In more than a thousand determinations, in hundreds of patients studied, Ilosone has never failed to provide significant antibacterial levels in the serum.

The usual dosage for adults and children over fifty pounds is 250 mg. every six hours, but doses of 500 mg. or more may be administered safely every six hours in more severe infections. For optimum effect, administer on an empty stomach. Supplied in Pulvules of 250 mg. (For children under fifty pounds, a 125-mg. Pulvule is also available.)

1. Antibiotic Med. & Clin. Therapy, *5*:609, 1958.
2. Data from Antibiotics Annual, p. 269. 1954-1955.

Ilosone™ (propionyl erythromycin ester, Lilly)

ELI LILLY AND COMPANY • INDIANAPOLIS 6, INDIANA, U. S. A.

932548

The JOURNAL *of the*
KANSAS MEDICAL SOCIETY

Copyright, 1959, by the Kansas Medical Society

Volume LX **MARCH, 1959** **No. 3**

The Medical Center

The Dean's Report on Personnel, Facilities, Budget, and Future Prospects at the School of Medicine

W. CLARKE WESCOE, M.D., Kansas City

It is a privilege to write a prefatory statement for the University of Kansas Medical Center issue of the JOURNAL OF THE KANSAS MEDICAL SOCIETY in this, the centennial year of the Society. The School of Medicine, in its own 54th year of existence, salutes the Society with whose interests it is indissolubly a part. The story of the past year and of the present one continues to be one of growth and progress. The salient features of that story follow.

Personnel. From the standpoint of faculty, there were few changes to be reported in the last year. This fact can be taken, we believe, as an estimate of the stability of the school.

On July 1, 1958, Dr. Donald C. Greaves joined the faculty as professor of psychiatry and chairman of the department. Dr. Greaves came to the school from the University of Oklahoma School of Medicine, where he had been associate professor of psychiatry since 1955. He is a graduate of Washington University School of Medicine and a graduate of the residency program in psychiatry of Cornell University. Dr. Greaves brings to this department dynamic leadership, and we look forward both to his growth and that of the department.

Similarly on July 1, Dr. Jack Walker, a graduate of this school with the class of 1953, joined the administrative staff in the position of administrative assistant to the dean. Dr. Walker had practiced medicine in Girard for several years. His return to the school resulted from his deep interest in medical education and his desire to become intimately concerned with it.

On September 1, Dr. Paul Lorhan resigned his position as professor of surgery (anesthesiology). He had served on this faculty for a period of 20 years. We regret his leaving for the sunny climes of California. The position of acting chief of the Anesthesiology Section in Surgery has been filled competently since that time by Dr. John M. Hansen.

Facilities. Since the last similar report was made, the Children's Rehabilitation Unit on the campus has been dedicated. It is now in full operation, under the direction of Dr. C. Arden Miller. This unit is a model, studied by many others, in the integration of education in several disciplines, in research, and in service to individuals as well as in service to the state.

In November 1958, the unit for radiology and radiotherapy was completed. This $125,000 structure allows for centralization of the radiology program in a manner that was not heretofore possible. It contains waiting areas that have long been needed. Perhaps of greatest interest to the Society membership is the installation of a cobalt therapy unit.

Architectural drawings are now in process for the remodeling of the third and fifth floors of the Hixon Building. The third floor, vacated by the Department of the History of Medicine when the library was completed in 1957, will be renovated to provide laboratories for the Department of Pharmacology. The fifth floor will be subjected to modernization.

It should be mentioned that at the present writing, and for the first time since 1948, there is no major construction in progress at the Medical Center.

Budget. This is being written, of course, at a time

when the legislature is in session and budget matters are pre-eminent. Our legislative requests show no great increase over last year's (approximately $95,000) and are actually under those of three years ago. A point of interest is that the Medical Center earns through direct income, gifts, and grants approximately two-thirds of its annual budget.

Future. We are now prepared to move forward with the construction of the science facility that will allow finally for the consolidation of the School of Medicine on one campus in Kansas City. This consolidation should have taken place 50 years ago. A federal grant of $850,000 has been approved. If the legislature acts to provide the matching funds, the dream will become a reality. If, on the other hand, the legislature fails to act, the federal funds will be lost and reality will become once more a dream. In this effort we cannot fail if we are to continue our status as an outstanding school.

As always, the relationships between School and Society continue to be the best possible. For the understanding support and encouragement of the Society we are extremely grateful.

Your comments on this issue of the JOURNAL will be appreciated. If you have suggestions for future issues, do not fail to let us hear from you.

Tetanus Prophylaxis

The Need for Better Understanding of Its Value

DON R. MILLER, M.D., *Kansas City*

During informal conversation among a group of physicians at a recent postgraduate meeting, one doctor related the catastrophic events which followed an intradermal skin test of diluted tetanus antitoxin in a patient who had received minor injuries to the hand. By rapid institution of proper treatment, the life of the patient was saved.

Most physicians can recall similar personal instances of severe, sometimes lethal, reactions to tetanus antitoxin. Morbidity and mortality rates from tetanus infection are increasingly high. How relieved is the physician when the exposed patient says, "Yes, I have been immunized," and the decision whether to use tetanus antitoxin does not have to be made.

Active tetanus immunization, which may be acquired by receiving two injections of tetanus toxoid, has been enjoyed almost exclusively by two groups, the armed forces participants of World War II and later, and those immunized in infancy during the past few years. Few of the remaining adult population have been actively immunized or even know of the need or availability of this immunization. This lack of knowledge is based upon the lay person's difficulty in understanding the difference between active and passive immunity, and upon our failure to recommend the immunization to them.

From the Department of Surgery, University of Kansas Medical Center.

The value of active immunization in the prevention of tetanus was most effectively demonstrated during World War II, when tetanus among U. S. armed forces was virtually absent. The incidence of tetanus in the U. S. Army during World War I, when antitoxin prophylaxis only was used, was 13.4 cases per 100,000 wounded. Comparable statistics during World War II, after the adoption of toxoid immunization, showed an incidence of only 0.44 cases per 100,000 wounded. Severe reactions to the toxoid injections are extremely rare.

The large number of accidental injuries occurring on farms and highways and around the home make universal active immunization against tetanus desirable. Patients should be urged to receive immunization at the time of yearly routine examinations. While little rapid protection is provided by the first toxoid injection in the unimmunized patient, there is no better time to start active immunization, in addition to passive immunization, than when the patient is seen in the hospital emergency room following possible tetanus exposure. At this time he will be most receptive to advice concerning the need for further protection against tetanus infection and possible serum reactions.

Department of Surgery
University of Kansas Medical Center
39th and Rainbow
Kansas City 12, Kansas

Acid Base Balance

Study of Related Cellular Metabolic Considerations

SANTIAGO GRISOLIA, M.D.; LEWIS MOKRASCH, Ph.D., *and* HAROLD GRADY, Ph.D., *Kansas City*

The material presented here has evolved from seminar discussions conducted by one of us (S.G.) with the residents of the Department of Internal Medicine. These seminars are intended to refresh the physiological and biochemical background of the residents. We have attempted to simplify and integrate basic concepts and carry out rough calculations relating biochemical and physiological measurements and considerations. Unfortunately, the present generation of biochemists, busy with special problems, rarely thinks in physiological terms. Physiologists suffer from the same limitations, and in the meantime the language of their one-time offspring has become a language of its own.

Some extrapolations and speculations have been introduced, not because of their possible or true medical value, but to show the exciting possibilities of physiology and biochemistry to people burdened with immediate clinical problems. No attempt has been made to make a complete chapter nor to cover facets of respiration and of acid-base balance described already in many excellent publications. There is no bibliography, since an adequate bibliography would require as much space as the entire text.

Biochemical reactions underlying the phenomena of respiration, energy production, and regulation of pH are intimately interrelated. Comprehension of these reactions and particularly of their interrelationships will aid in the understanding of acid-base balance and of metabolism in general.

To emphasize the tremendous magnitude of the production and removal of hydrogen ion which is carried out by cellular respiration, consider the following example. If a person derived 2,200 Calories per day from glucose alone, this would correspond to the consumption of about 540 grams or 3 moles of glucose ($C_6H_{12}O_6$, molecular weight 180). Considering the hydrogen in the molecule, if in 180 grams glucose there are 12 grams (or 12 equivalents) of H, there will be 36 grams in the 540 grams of glucose, which must at some time exist as hydrogen ion. This would be equivalent to one liter of concentrated sulfuric acid.

The authors are from the Department of Medicine, University of Kansas Medical Center.

The over-all reaction for the oxidation of glucose is sometimes written as shown in Equation 1.

$$C_6H_{12}O_6 + 6O_2 = 6CO_2 + 6H_2O$$

It should be noted that the 6 moles of oxygen used balance the 6 moles of carbon dioxide produced and therefore the respiratory quotient, $\frac{CO_2 \text{ expired}}{O_2 \text{ inspired}}$, is 1.

Equation 1 is misleading for the present discussion. At first glance 12 hydrogen atoms per mole of glucose may at some time or other exist as hydrogen ions. During biological oxidations the hydrogen will be transferred to a series of coenzymes before its combination with oxygen to form water. This and other phenomena to be discussed in some detail indicate the magnitude of the task dependent on cellular respiration.

Acid-base balance is at once one of the most important and the most misunderstood areas of medical information. This article presents in concise, lucid form the foundation upon which an understanding of acid-base balance can be built. Although it will require collateral reading, mastery of this article will be a rewarding postgraduate experience for the reader. (Editor)

After oxidation of the substrates, the carbon appears as carbon dioxide which is carried as carbonic acid and bicarbonate in the blood which are in equilibrium according to Equation 2.

$$CO_2 + H_2O \rightleftarrows H_2CO_3 \rightleftarrows H^+ + HCO_3^-$$

When one mole of glucose is oxidized another 6 equivalents of H^+ appear from the hydration of 6 moles of CO_2 and its ionization, or from the oxidation of 540 grams of glucose, another 18 equivalents of H^+ are produced.

Since the blood and total extracellular fluid of an average man contain about 0.15 moles and 0.35 moles of "total CO_2" (CO_2 plus bicarbonate) respectively,

the daily production and removal of carbon dioxide represents about 100 times the CO_2 and bicarbonate in blood and about 50 times the bicarbonate and CO_2 present in the extracellular fluid, corresponding to turnover times of 15 and 30 minutes, respectively.

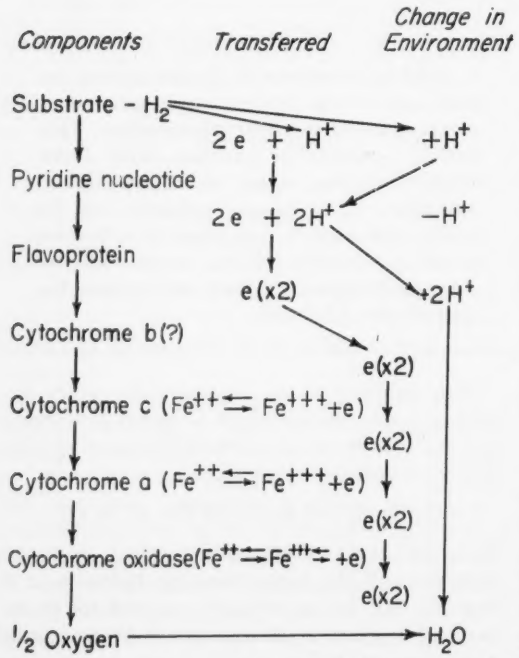
Having demonstrated that a large amount of H^+ is involved in metabolic transformations, to examine the matter in greater detail four related processes will be considered:

A. Cellular respiration—this process results in the removal of hydrogen atoms from substrates, with the formation of water and CO_2 and the regeneration of the terminal anhydride phosphate bond of adenosine triphosphate (ATP) which is the main source of usable chemical energy for the organism.

B. Buffer systems—with particular reference to the carbonic acid-bicarbonate system and to its respiratory regulation.

C. Nitrogen elimination—by this process amino nitrogen is converted into neutral urea. This process is intimately connected with Process A since it requires energy as adenosine triphosphate (ATP) and since the hydrogen ion liberated during deamination and ATP utilization is removed as water by cellular respiration.

D. Kidney "acid base valve." It cannot be over emphasized that with the exception of Process D, other processes are not able to produce a net change in acid or base, except for limited periods. Process A is potentially able to carry a large amount of hydrogen through the form of hydrogen ion to produce water, but it is a self-cancelling process. If this were not so, the whole organism would go into extreme acidosis or alkalosis. Process B is able to regulate the moderate changes in pH of a temporary nature. Finally, net prolonged change in amount of acid or base can be accomplished only by the kidney.



Sum: $AH_2 + \frac{1}{2}O_2 \rightarrow H_2O + A$ (+ ATP, usable energy for cellular work)

Figure 1

A. *Cellular respiration.* The purpose of cellular respiration is to produce energy in the form of ATP through the oxidation of substrates which come from ingested food. During breakdown of substrate the energy present is converted to biologically usable energy. For the most part, this process of conversion of energy occurs during oxidation resulting in the production of carbon dioxide and water. The scheme for these processes is shown below. Inspection of the scheme shows that the hydrogen ion liberated during these processes is completely converted to water. Assuming food (AH_2, substrate) to be oxidized to A (partially degraded substrate), reactions will occur as shown in Figure 1.

Thus no *net* change in hydrogen ion concentration occurs in the removal of hydrogen from the substrate. Wherever hydrogen or electron transfer occurs (Figure 1), the energy of these reactions may be used to put together inorganic phosphate and adenosine diphosphate (ADP) to form ATP. The above scheme accounts only for hydrogen of the substrate, but a related scheme will apply to the carbon chain oxidation of carbohydrates, fatty acids, and amino acids to CO_2. The amino acid nitrogen will be incorporated into urea as will be shown later.

Although the over-all mechanism of cellular respiration is well known, there is still lack of understanding of the intimate mechanism, particularly of the "combination" of hydrogen and oxygen at the cytochrome oxidase step. That is to say that although the mechanism of electron transfer to O_2 is unknown, the reaction

$$\tfrac{1}{2}O_2 \xrightarrow{+2e} O= \xrightarrow{H_2O} 2OH^- \xrightarrow{2H^+} 2H_2O$$

could be incorporated in the above scheme.

During the formation of ATP from inorganic phosphate and ADP, at the expense of oxidation, hydrogen ion is removed from the medium, and during the hydrolysis of ATP, hydrogen ion is liberated as can be seen by inspection of the formulae in Figure 2.

It follows then that combination of inorganic phosphate (Pi) and ADP to give ATP results in alkalinization since H^+ disappears. The contrary will happen

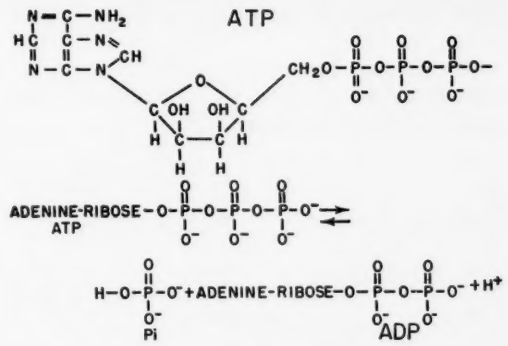


Figure 2

when the reverse reaction occurs since then H^+ appears. At pH 7.4 this results in a net change of around 0.5 acid equivalent per mole. Thus at a steady state (ATP formation equal to ATP breakdown—approximately 0.1 mole/min.) no change in hydrogen ion concentration occurs. However, this system is capable of either removal or addition of hydrogen ions to the system as a temporary dislocation of the "steady state."

Thus during the steady state for each mole of glucose oxidized to CO_2 and water with the production and utilization of energy as ATP, some 40 moles of hydrogen ion will be produced and used as follows:

1. 12 H (1 mole of glucose) + 10 DPN* + 2 oxid. flavin → 10 DPNH* + 2 reduced flavin + 10 H^+

2. 10 DPNH + 10 H^+ + 10 oxid. flavin → 10 reduc. flavin + 10 DPN

3. 12 reduced flavin + (6 O_2) → 24 H^+ + 12 oxid. flavin + (12 $O^=$)

4. 24 H^+ + 12 $O^=$ → 12 H_2O; or a net hydrogen ion production and utilization of at least 24 per mole of glucose

5. 6 CO_2 (1 glucose) + 6 H_2O → 6 HCO_3^- + 6 H^+

6. 1 glucose → about 40 ATP formed and used or about 20 moles of H^+ exchange at physiological pH. The addition and subtraction of H_2O during the metabolic transformations leading to total oxidation of glucose has been ignored, since it would add little to the present example.

An important store of immediately available energy is present as creatine phosphate. There is about ten times more creatine phosphate than ATP in tissues, and ATP is in equilibrium with creatine as shown in Figure 3.

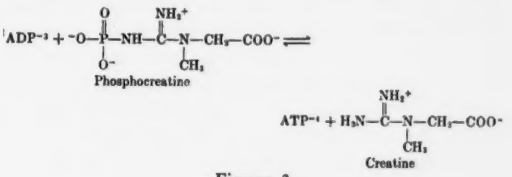


Figure 3

At pH 7.4 liberation of hydrogen ion occurs when creatine phosphate is formed. This phenomenon has two important biological consequences:

First, the ATP-creatine phosphate equilibrium can serve as a donor or acceptor of H^+. For a 70 kg. man, assuming 40 per cent of his body weight as muscle containing 0.6 moles phosphocreatine, this capacity to accept hydrogen ions upon hydrolysis is about 300 milliequivalents (about 0.5 equivalent H^+ formed per mole of phosphocreatine hydrolyzed at neutral pH).

Second, in the absence of oxygen supply or when oxygen supply is insufficient (oxygen debt), one must draw from the creatine phosphate and glycogen stores for survival. Although the turnover number of cytochrome is sufficient to take care of all respiratory needs, a normal man has less than 70 micromoles of cytochrome in his body and this is of course of little storage value for energy production as oxidized cytochrome.*

The use of 2,200 Calories per day will be equivalent to the production and utilization of 100 moles of ATP (around 7,000 calories/mole) as high energy

* DPN is an abbreviation for diphosphopyridine nucleotide, and DPNH is the reduced form of DPN.

* In this regard it is of interest to consider that the amount of cytochrome C in the heart, brain, kidney, and muscle of a 70 kg. man is 92.7 mg. or about 7.8 micromoles. The basal oxygen uptake of these organs quoted by the same author is 174.8 ml. O_2 per minute or about 7.8 millimoles O_2; therefore, the turnover per minute in terms of electron transfer for cytochrome C in these organs is:

$$\frac{4 \times 7.8 \times 10^3}{7.8} = 4000$$

7.8 micromoles of cytochrome C will allow the uptake of 0.81 ml. of O_2 per minute as tested with kidney preparations. This figure should be corrected by a factor of 50 to 100, since endogenous cytochrome C is more effective or 81 ml. O_2 uptake per minute, still short by a factor of 2 from the figure 174.8. From other figures in the literature, 1 micromole of cytochrome C can catalyze the uptake of 1400 micromoles O_2 per minute or 7.8 × 1400 = 10.8 millimoles O_2 or 243 ml. O_2 per minute. From these figures, albeit only tentative for calculations of true rates in vivo, one is left with the impression that cytochrome C is operating near capacity in certain organs. To our knowledge, there are not recorded increases of metabolic rates of over 2 taking into consideration that the "basal" metabolic rates are probably over the "base line" by a certain percentage. One is led to speculate that extreme increases in respiratory rates during violent exercise may be primarily needed to aid in the mechanical removal of CO_2.

phosphate (assuming 30 per cent efficiency), and this will be roughly equivalent to the utilization and production of 0.1 mole ATP per minute. In the absence of respiration and of the regeneration system for chemical energy, one could draw on the creatine phosphate stores (0.6 mole) and survive for only about five minutes without respiration. Of course irreversible damage to the brain would occur before the critical point for survival was passed for the remainder of the body.

B. Obviously, the regulation of the pH of the blood and other fluids is the resultant of the mixed buffer systems but mostly, except for proteins, due to the phosphate and bicarbonate buffers. Teleologically speaking, this is not surprising because, as indicated before, the bulk of metabolism depends upon the conversion of metabolites to CO_2 and H_2O via phosphorylated intermediates. The phosphates are in equilibrium with the ADP-ATP phosphocreatine system. Metabolic CO_2, which is essentially a waste product in the animal, partakes in the regulation of pH by means of the gross respiratory regulation of the carbonic acid concentration. Although this system may compensate for small changes in pH, it cannot result in a continuous removal of H^+.

Consider again Equation 2:

$$CO_2 + H_2O \rightleftarrows H_2CO_3 \rightleftarrows H^+ + HCO_3^-$$

An increase in hydrogen ion concentration causes increased respiratory removal of CO_2 which reduces carbonic acid and hydrogen ion concentration. However, this is limited by the fact that bicarbonate can be made only by the reversal of the above reaction, producing as much hydrogen ion as is removed. The net effect cannot be more than the total bicarbonate in the body fluids (20 to 25 mEq./L of extracellular body fluids), and this is only a small fraction of daily CO_2 production and excretion.

The increase in bicarbonate in the red cell due to carbonic anhydrase with the resultant chloride shift results in the transfer of water into the red cell. It is of pedagogic interest to remember that a small part of this change is necessarily due to the fact that some of the water is used to make carbonic acid from CO_2.

C. A further example of potential removal or addition of hydrogen ions occurs in glutamine metabolism. Glutamine is synthesized as shown in Figure 4.

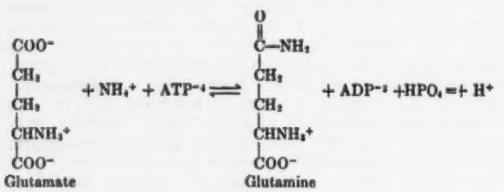


Figure 4

This reaction occurs mainly in the liver and in the brain. When glutamine is used in the kidney, results occur as indicated in Figure 5.

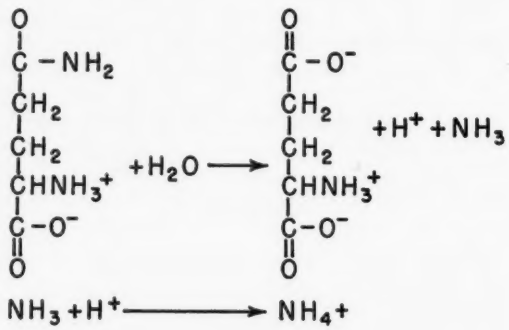


Figure 5

The increase in hydrogen ion in the reaction is balanced by the disappearance of one hydrogen ion in the conversion of ADP and inorganic phosphate to ATP (Figure 2). Thus the over-all effect is the utilization of the energy of ATP to transport ammonia (as glutamine) from the liver, the major site of ammonia production and urea synthesis, to the kidney where the released ammonia can carry one hydrogen ion out into the urine.

The liver is the major site of urea production. All amino acids with the exception of lysine are in a steady state of interconversion, due to the abundance of transaminases. There are, however, only two quantitatively important ways known by which amino nitrogen can be transformed into urea, first, as free ammonia from glutamic acid through the action of glutamic dehydrogenase, and second, as aspartic acid as in Figures 6 and 7.

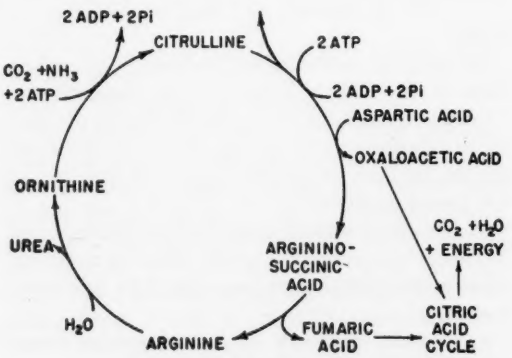


Figure 6

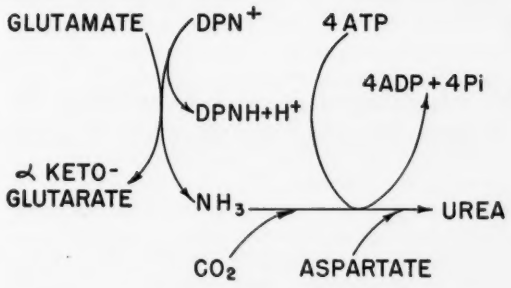


Figure 7

In the above scheme, by the action of glutamic dehydrogenase, ammonia is liberated from glutamate to yield one of the nitrogens of urea, and during this process an equivalent of hydrogen ion is formed as follows:

$DPN^+ +$ glutamate $\rightarrow NH_4^+ + DPNH + H^+ +$ α-ketoglutarate

The H^+ liberation during urea formation can also be seen in this simple equation:

$$2NH_4^+ + H_2CO_3 = NH_2 - \overset{O}{\overset{\|}{C}} - NH_2 + 2H^+ + 2H_2O$$

Therefore, assuming an average of 30 grams (0.5 mole) of urea formed per day, twice an equivalent amount of hydrogen *(1,000 milliequivalents)* is removed by the respiratory process as H_2O together with the 1,000 milliequivalents of H^+ produced by the utilization of 2 moles of ATP at pH 7.4 during this process. On the other hand, the normal 24-hour excretion of hydrogen ion plus ammonia by the kidney is only 50-70 mEq. The example emphasizes the importance of the respiratory chain in removing hydrogen ion production during metabolic processes. In severe acidosis (diabetes) this can increase up to 500-700 mEq. of hydrogen ion per 24 hours. However, only part of this maximal response can occur rapidly. That part of hydrogen ion removal mediated through ammonium ion formation requires 48 hours or longer to establish its maximum rate. It is of interest to speculate that this lag may be related to the time required to establish glutamine synthesis, for example, at its highest rate. Thus the immediately available hydrogen ion excretion (to correct a suddenly developing acidosis) is about 150 mEq. per 24 hours while the 350 mEq. of hydrogen ion per 24 hours removed as ammonia is not available for at least 12 hours.

The actual process of hydrogen ion removal by ammonia formation is not known, but it is generally believed that ammonia itself diffuses from the tubular cell into the tubular urine and then combines with hydrogen ions to form ammonium ions. This lowers the hydrogen ion concentration of tubular urine and thus permits exchange of tubular sodium ions for more tubular-cell hydrogen ions. The latter process is, of course, the urine acidification process that is immediately responsive to an increase in the blood pH.

From the above considerations, it is clear that the only efficient therapeutic manner for correcting extreme changes in hydrogen ion concentration is by the addition of either base or acid or substrates which by metabolic processes can result in alkalinization or acidification, for example, by the administration of sodium lactate and ammonium chloride respectively.

Summary

Classical considerations of problems of acid-base balance have ignored the extremely large donation and removal of hydrogen ion resulting from the reactions involving the utilization of food to produce energy. Simple calculations show that this production of hydrogen ion, which must be exactly balanced by processes of removal, is as much as 150 equivalents per day compared to a maximum removal by the renal mechanism of 0.5 equivalents per day.

All hydrogen on substrate molecules, as well as an equal quantity of hydrogen from water, appears as hydrogen ion in one stage of its transport to oxygen to form water. The energy produced by these reactions is stored primarily in two compounds (ATP and creatine phosphate) which in this interconversion can, if imbalance occurs, cause a large excess or deficit of hydrogen ion, particularly at the cellular level.

The systems for hydrogen ion regulation, in addition to the delicate balance of production and removal mentioned above, are the renal, respiratory, and the body buffer systems. Proteins, bicarbonate, and phosphate are the most important buffers, although bicarbonate is especially effective because of its regulation by the respiratory system. The renal mechanism depends upon tubular hydrogen ion excretion or absorption either directly or through ammonia formation from glutamine. The liver thus participates in regulation of hydrogen ion concentration by glutamine synthesis.

Both the buffers and the respiratory system have severe limitations with respect to compensation for a prolonged and progressive increase or decrease in hydrogen ion concentration. Only the renal mechanism with ammonia production at maximum can combat large changes in hydrogen ion concentration.

We wish to thank our colleagues, Doctors George Curran, E. G. Dimond, Daniel Darrow, Paul Schloerb and Gerhard Plaut, for reading the manuscript and offering comments and suggestions.

Department of Medicine
University of Kansas Medical Center
Kansas City 12, Kansas

Carcinoma of the Cervix

Study of Diagnosis and Treatment in 1,000 Patients in 28-Year Period

L. A. CALKINS, M.D., ***Kansas City***

From September 1929 to September 1957, 1,000 patients with carcinoma of the cervix were treated by members of the Obstetrics and Gynecology Department at the University of Kansas Medical Center. This is not an imposing number, but most cases were referred by Kansas physicians and, therefore, represent a diagnostic performance by Kansas practitioners. In addition, all became the responsibility of our treatment facilities at the Medical Center, so a report to the Kansas profession seems in order.

This report will be in two parts. First we would like to point out a marked improvement in the profession's attitude toward carcinoma in general and toward carcinoma of the cervix in particular. This change, with some improvement in diagnostic methods, has led to much earlier diagnoses. Secondly, we would point out that treatment facilities at the Medical Center have also improved with startling increases in good end results.

The first 500 of these patients were treated between September 1929 and September 1943. The second 500 were seen between September 1943 and September 1957. The dividing line (September 1943) was chosen, not only because it divided the material equally, but also because (a) the change in professional attitude occurred about then and (b) the Medical Center acquired better external radiation apparatus and techniques at about the same time.

It is well established that carcinoma anywhere in the body can be cured only if (1) a sufficiently early diagnosis is made and (2) proper therapy is promptly instituted. That much earlier diagnosis was made in the second half of this period is amply demonstrated in Table I.

It is remarkable that not a single early (stage I) patient reached us in the first four years of this period and that our first such patient was erroneously diagnosed as an advanced case. Almost every patient today is correctly diagnosed as to extent of the lesion and is sent to us with reasonable dispatch. That two-thirds of the first group were hopeless, or nearly so, and that this percentage has decreased to 45 is a tremendous tribute to the Kansas profession.

TABLE I

	Sept. 1929-Sept. 1943		*Sept. 1943-Sept. 1957*	
	Number	*Per Cent*	*Number*	*Per Cent*
Stage I	35	7	112	22
Stage II	133	27	164	33
Stage III	214	43	131	26
Stage IV	118	23	93	19
Total	500	100	500	100

Earlier diagnosis and improved facilities for treatment of carcinoma of the cervix are reflected in a comparison of statistics in 500 patients seen before September 1943 with 500 patients seen after that date. Additional comparisons will be made in 1962 when patients in the latter group will have passed the five-year mark.

There has been a remarkable change, in 30 years, from the attitude that carcinoma is a hopeless situation and that treatment is therefore useless. Improved methods of early diagnosis are now also playing an increasingly important role. The Papanicolaou smear has helped, but more important has been the more frequent use of biopsy. To be conscious of the possibility of carcinoma, even in the young patient, will always remain, however, the most important factor.

It is obvious that the efforts of the Kansas Division of the American Cancer Society have markedly reduced delay in patient treatment and have instilled a considerable hope of cure in these individuals. That some cancer phobia has resulted is not too great a price to pay. Sufficiently careful and complete examinations will allay the fears of nearly all these people. A single negative Papanicolaou smear will never suffice for this purpose. That more public education and still more cancer consciousness on the part of the physician are necessary is evidenced by the fact that nearly half of the patients in the second half of this study did not reach us until their chances for cure were all but gone.

It has been our policy, throughout this period, to treat all patients with radium and x-ray. A few, too small a number to affect over-all results, have errone-

ously been treated otherwise. Our plan of radium therapy has been constant. The choice of applicator, bomb, or interstitial use of the element, the calculation of dosage, and the timing thereof have always been carefully selected according to the stage of the disease, the age of the patient, and the amount of associated inflammation or other complicating factor. It has been our belief that overdosage is quite as wrong as under dosage. X-ray therapy, on the other hand, has been greatly improved in the second half of the study, and the great improvement in results shown in Table II should be credited to improved x-ray therapy.

In the earlier part of this study only a low voltage x-ray apparatus was available and dosage was, for the most part, kept low to avoid gross normal tissue damage. In the latter series, more nearly adequate dosage was possible with higher voltage apparatus. With the newly acquired Cobalt bomb machine, it should be possible to still further reduce normal tissue damage and, perhaps, still further improve the "cure" rate. The five-year salvage shown in Table II is so superior to the results from even the best surgery, anywhere in the world, that in our opinion it is proper to condemn surgery as the primary treatment in carcinoma of the cervix. In the small percentage of radiation failures, surgery should be used in properly selected patients.

TABLE II

	Sept. 1929-Sept. 1943		*Sept. 1943-Sept. 1957*	
	Number	*5-yr. Salvage*	*Number*	*5-yr. Salvage*
Stage I	35	66%	69	88%
Stage II	133	49%	113	57%
Stage III	214	28%	111	33%
Stage IV	118	2%	66	8%
Total	500	30%	359	47%

It is planned to present a further report when all of the second 500 patients have passed the five-year mark (1962) and, perhaps then, include figures as to 10- and 15-year salvage (all of our patients are being followed 15 years). Although it has been a big undertaking, we have consistently worked toward a complete 15-year record. Three of the first 500 patients have been lost to follow-up and have therefore been counted dead, but, so far, the present status of all of the second 500 is known.

Department of Obstetrics and Gynecology
University of Kansas Medical Center
39th and Rainbow
Kansas City 12, Kansas

If the source of our strength lies within ourselves, there too is the area of potential weakness. I do not believe we can be defeated by any foreign foe but I believe it is possible for us to defeat ourselves. It is possible for us to lose by default if we are betrayed by false hopes, if we are paralyzed by apathy, indifference and overconfidence, if we are blind to the lessons paid for in blood by earlier generations of free men.

To keep self-government healthy, to make maximum use of the mechanisms held in our own hands we must see that local governments do their jobs in full. So urgent are the requirements of modern society that what the town or city will not do, the the state must do; and what the state will not do, the national government must do. But when the larger unit takes over the functions of the smaller one, costs steadily mount, popular control progressively weakens, exterior power constantly increases. The solution of the critical dilemmas confronting us lies in community acceptance of responsibilities which the community now tends to evade.

Through this means, and this means alone, can we assure the preservation of our basic liberties, our traditions, our free-enterprise system based on individual merit and effort, equality of opportunity and open competition. Through this means, and this means alone, can we assure the maintenance of a national government that is sound in its principles, enlightened in its administration, conscious of its supreme responsibilities and dedicated to the cause of free men.

—*Robert Montgomery*

Orabilex

Evaluation of a New Cholecystographic Medium

GALEN M. TICE, M.D., ***Kansas City***

It is our impression, from a study of 152 cases during a seven-month period terminating December 15, that Orabilex is a satisfactory medium for examination of the gallbladder. It produces a relatively small number of side effects; visualization is excellent regardless of the patient's size, and re-examination is seldom required. The technique is simple. It varies in no respect from that which has customarily been used for other media. There is an absence in most instances of confusing gastrointestinal shadows.

The clinician is often confronted with a patient in whom a differential diagnosis must be made as to the cause of abdominal or thoracic pain. Especially is this true if the distress is in the right upper quadrant. Under these circumstances a study of the biliary tract is of inestimable value.

Prior to 1924, many workers reported observations of roentgenological evidence of gallstones from routine examinations. Only radiopaque stones could be diagnosed. In 1924 Graham[1] and his co-workers developed a medium which, when injected intravenously, made possible visualization of the biliary tract. This opened a new field for x-ray diagnosis. Soon after this a medium was designed for oral administration.

Our first experience with x-ray examination of the gallbladder, starting in 1930, was with the original medium, tetraiodophenolphthalein. Nausea and vomiting usually accompanied the oral administration of this substance, and in our experience rather severe reactions occurred following its use by the intravenous route. In the interval since then various products have been made available by pharmaceutical houses for oral use, and each has shown some improvement over previous oral preparations. We occasionally use a refined type of intravenous preparation, particularly if it is important to visualize the ducts in the postoperative patient whose gallbladder has been removed. Most gallbladder studies, however, are done with oral material.

During recent months it has been our privilege to use a new medium, Orabilex, which has only recently been placed on the market. Orabilex, a development of the Guerbet Laboratories available now through the Fougera Company, is a brand of bunamiodyl. It is described as 3(3-butyrylamino-2,4,6-triiodophenyl)-2-ethyl sodium acrylate. Orabilex has a molecular weight of 661; is a white, odorless, slightly hydroscopic powder which contains 57 per cent of iodine, and it is somewhat soluble in water and alcohol. It is stable under normal conditions with heat and light but should not be exposed to strong light.

The toxicity of Orabilex has been thoroughly tested. Intravenous injection of 200 mg. per kg. produced no observable discomfort or reaction in rabbits; the same dose produced no apparent discomfort in cats.[2] The LD-50 in rats after intragastric administration was found to be 2.2 Gm/Kg body

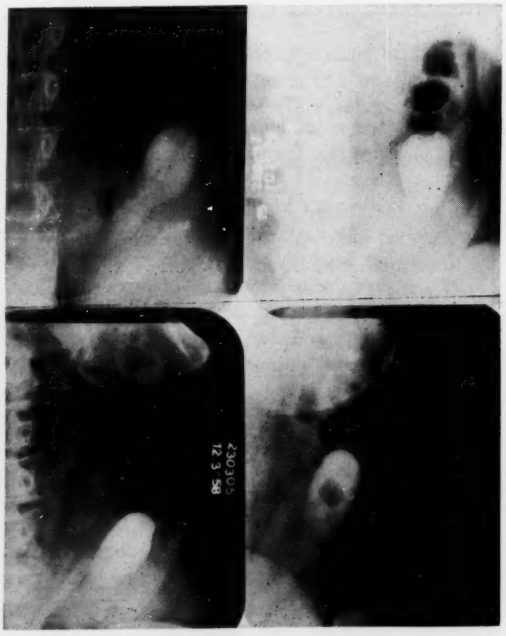


Figure 1. Films of four different patients of average weight show gallbladder shadow to be expected after ingestion of the recommended six tablets of Orabilex.

weight.[3] In tests on dogs with daily oral doses to the amount of 1.5 Gm/Kg, Orabilex powder did not seem to affect the general activity of the animals. At the end of two weeks kidney and liver function tests were normal and the animals were killed. Gross examination of all organs showed no damage of any type, nor was any damage seen on histological study of the kidney, spleen, duodenum, thyroid, and liver.[3]

Having been satisfied that the substance was nontoxic in animals, we used it in studying a series of patients. On May 14, 1958, we started a clinical trial of Orabilex. From that date until December 15, a period of seven months, we gave the substance to 152 individuals on an outpatient basis. We have been impressed by the lack of serious toxicity, good visualization of the gallbladder, uniformity of the dose delivered to the patient regardless of weight, and lack of excess opaque material scattered over the x-ray film in the gastrointestinal tract.

The reaction of the patient to the opaque medium was evaluated by the office secretary when the patient reported for films. Undoubtedly the personal equation entered into this evaluation. Listed in Table I are the types of reaction and the percentage who had the reaction as determined by this evaluation.

It is seen in this study that there was a moderate degree of nausea. Personally we were not impressed with the fact that any patient suffered a great deal from the various symptoms listed. One person complained of numbness in the arms and feet and a rapid heart rate. It would be hard for us to correlate this with the medication taken.

TABLE I

Nausea	17 %
Vomiting	3 %
Diarrhea	2 %
Headache	6 %
Skin rash, one patient	.7%
Intestinal cramps	1.4%
Indigestion	1.4%

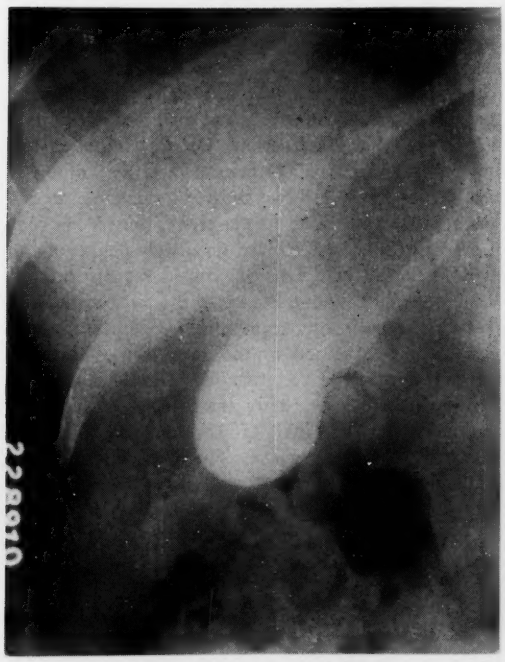


Figure 2. Concentration of Orabilex in a patient weighing 225 pounds.

In using other opaque media, we customarily have given double the dose recommended by the pharmaceutical house supplying the medium. This procedure has developed over several years experience in which we found that the shadow was faint if we used the routine dose recommended. Consequently, as a matter of protecting ourselves and saving the patient a repeat trip, twice the original amount has been used.

With Orabilex, we have found that adequate visualization is produced in all adult patients, regardless of weight, by using the recommended dose. In only two of our patients did we increase the dose. In one patient there was a non-functioning gallbladder which did not function with the increased dose. In the other there was rather faint concentration which was not appreciably increased by using nine instead of six tablets. We found that even with patients weighing over 200 pounds the dose recommended for Orabilex was adequate (Figure 2).

In Table II we have shown the degree of concentration in the functioning cases:

TABLE II

Degree of Concentration	*Number*	*Per Cent*
Poor	5	3
Fair	23	18
Good	54	39
Excellent	55	40

We found good or excellent function in 79 per cent of the cases and poor function in only 3 per cent of the cases.

It has been suggested by other investigators that the duct system is better visualized with Orabilex than with other media. We are not prepared to form

an opinion. We do not customarily give the patient a cholagogue after gallbladder visualization, but when it was done we did see duct visualization approximately as frequently as with other media.

We have listed in Table III the results of our examination. It is doubtful if this has any relationship to the type of medium used. There was high visualization, almost 90 per cent. This, we suspect, relates to the type of patient selected rather than to the medium used in the examination.

We were impressed with the fact that in three cases in which the gallbladder showed no evidence of function when Orabilex was given, the intravenous preparation was injected and still no function was demonstrated. We feel that if oral preparations are used for gallbladder visualization and there is no evidence of function, the patient should not have surgery until an intravenous medium has been used.

TABLE III

Result of Examination	*Number of Cases*	*Per Cent*
Non-Visualization	16	10.5
Visualization	137	89.5
Stones	27	18
No stones	126	82
Opaque stones	8	30
Non-opaque stones	19	70

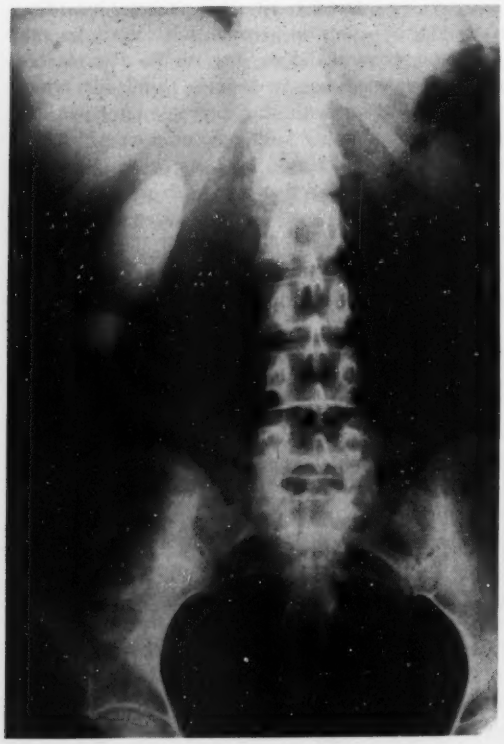


Figure 3. Film of abdomen showing no spillover of the opaque medium into the gastrointestinal tract.

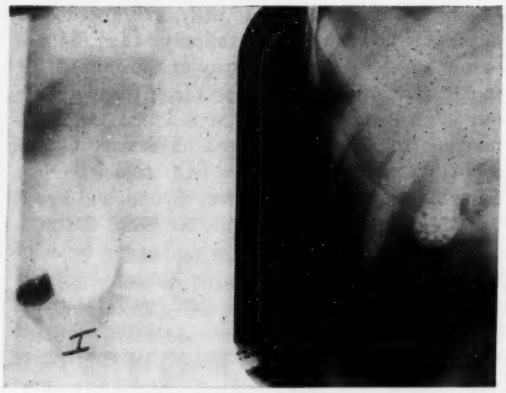


Figure 4. Left film shows floating stones with translucent line across the middle of the gallbladder. Right film shows "negative stones" or cholesterol stones.

One of the outstanding points in the use of Orabilex as compared to other media is the lack of dissemination of the medium through the intestinal tract. Our routine technique does not always include an abdomen film after the opaque medium has been given, although we occasionally take a film prior to the ingestion of the material. In this series there were 118 patients, however, who had abdomen films as part of the examination. Of this number ten showed minimal opaque material in the intestinal tract (8 per cent), and two showed moderate amounts of the opaque substance (2 per cent). Ninety per cent of the cases followed showed no dissemination of the medium in the gut. This we consider a distinct advantage since opaque substance in the gut occasionally overlies the gallbladder, presenting disturbing shadows. This is explained by the developer of this medium as due to the fact that Orabilex is eliminated largely through the urinary tract, in contrast to the predominately intestinal excretion of other media. None of our patients complained of dysuria as a result of this elimination.

Department of Radiology
University of Kansas Medical Center
Kansas City 12, Kansas

Bibliography

1. Wolfer, J. A.; in Tice: Practice of Medicine, 1952; Vol. 7, pp. 405-490.
2. Loth, V., and Jousso, T. R.: Unpublished report.
3. Levenstein, I., and Wolven, A.: Unpublished report.

Electrocardiograms of Weight-Lifters

Study of Findings in 26 Subjects

RUSSELL ETZENHOUSER; MARVIN DUNN, M.D., *and* E. GREY DIMOND, M.D., *Kansas City*

The search for knowledge in the field of electrocardiography has led the modern cardiologist to explore the electrocardiographic findings of all forms of vertebrates from the parakeet to the whale. Electrocardiographic findings in various occupational and athletic groups have been recorded. Although the electrocardiographic findings of weight-lifters are not as awesome as those of the whale, certain valuable information might be derived from a study of this group.

This study was supported in part by grants from the Kansas Heart Association and from the National Heart Institute. Mr. Etzenhouser is a senior student at the University of Kansas School of Medicine, Dr. Dunn is an instructor in the Department of Medicine, and Dr. Dimond is director of the Cardiovascular Laboratory.

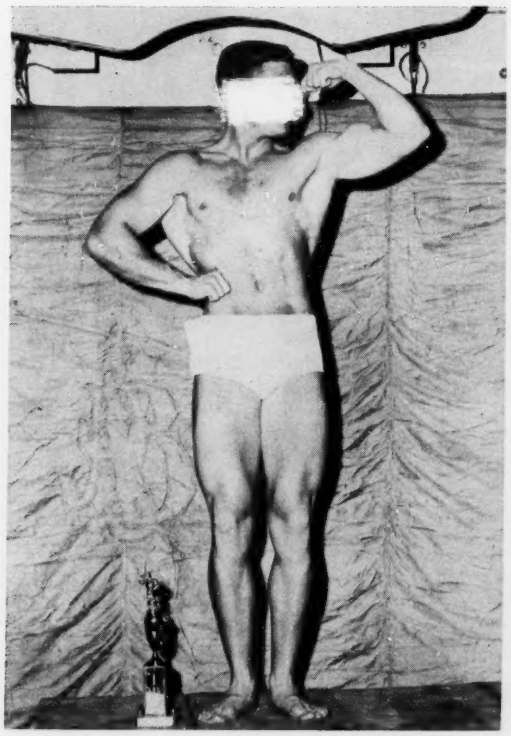


Figure 1. One of the weight-lifters used in this study.

The weight-lifter presents features which make him interesting to the cardiologist. He is one example of a highly conditioned athlete in whom the demands on the cardiovascular system have been just the opposite of the usual requirements of physical fitness. Practically all other physical fitness sports require sustained demands on cardiac output by increasing stroke volume and heart rate. The weight-lifter, by the unusual nature of his effort, does immense physical work while performing a Valsalva maneuver. Therefore, in practice, the weight-lifter impedes venous return, decreases cardiac filling, and decreases cardiac output at the same moment he exerts maximal effort. A documentation of the electrocardiogram at rest and after exercise in weight-lifters is not available in the literature. For these reasons we undertook a study of the electrocardiographic findings of weight-lifters.

Electrocardiograms were studied at rest and after exercise in 26 weight-lifters. A description of the tests and findings is presented.

Method

The study consisted of 26 male weight-lifters (Figure 1), ranging from 16 to 40 years of age. These men had been weight-lifting from 4 months to 10 years for 1½ to 20 hours per week. One of the men in the series was a Missouri Valley light-weight champion and another was a National AAU middle-weight champion.

Preliminary examination consisted of obtaining a medical history, weight-lifting history, blood pressure, and auscultation of the heart. A standard 12 lead electrocardiogram was then taken on each subject. Each subject then completed 50 trips over the standard Master's two steps in three minutes. Immediately after exercise, Leads I, II, III, V_4, V_5, and V_6 were taken and repeated at 2-, 4- and 6-minute intervals thereafter. Most of the records were obtained at physical fitness salons, and some unexpected technical problems were encountered.

Results

The results of this study are shown in tabular form in Figure 2.

Arrhythmia. The heart rate was not unusual in any subject, either before or after exercise. One subject, who had an occasional atrial premature contraction at rest, developed a marked arrhythmia after exercise with sinus pause, multiple ventricular premature contractions, multiple atrial prematurities with runs of atrial prematurities, and nodal prematurities (Figure 3). No other subject developed significant arrhythmia.

P Waves. One subject had broad notched P waves and two showed abnormal peaking of P waves. The P-R interval was normal in all subjects.

QRS Complex. Prolongation of the QRS complex was not present in any subject. No abnormal deviation of the electrical axis was found. One subject had an $S_1S_2S_3$ pattern. Five subjects met one of Sokolow and Lyon's criteria for left ventricular hypertrophy,[11] in that the sum of the S wave in V_1 and the R wave in V_6 was greater than 36 mm.; but their tracings did not show other criteria for this diagnosis.

QT_c and RST-T. The QT_c interval[8] was prolonged

EM Ejection murmur
3S Third heart sound
P Peaked P wave
$S_1S_2S_3$ $S_1S_2S_3$ pattern
LVH Left ventricular hypertrophy
RR′ RR prime pattern
† Terminal depression of the ST segment in V_4, V_5, V_6 after exercise
‡ Inverted T waves in Leads II and III before exercise
\+ U wave present
* Multiple atrial, nodal, and ventricular prematurities
SA Sinus arrhythmia

Patient	*Age*	*Years-Training*	*Hours/Week Training*	*Weight*	*Blood Pressure*	*Auscultation*	*Heart Rate*	*P-Wave*	*PR Interval*	*QT_c Interval*	*QRS*	*R-ST*	*U-Wave*	*Arrhythmia*
1	16	1	3	175	120/80	EM	100	P	0.12	0.45	—	†	+	—
2	26	1	9	175	130/70	—	92	—	0.18	0.39	—	—	—	—
3	20	2½	9		150/80	3S	83	—	0.14	0.39	—	—	+	*
4	21	2½	6		140/80	—	77	—	0.14	0.39	$S_1S_2S_3$	—	+	—
5	24	11	3	123	115/70	—	100	P	0.16	0.38	—	—	+	SA
6	23	6	3½		125/75	—	62	—	0.16	0.40	LVH	—	+	SA
7	19	4	5½	160	130/80	—	89	—	0.12	0.39	—	—	—	SA
8	27	1½	5	160	140/100	—	89	—	0.18	0.42	—	‡	—	—
9	25	3½	5	189	120/80	—	100	—	0.16	0.45	—	—	—	—
10	40	10	20	190	150/110	—	83	—	0.20	0.40	—	—	+	—
11	22	1½	1½	175	130/90	—	91	—	0.14	0.41	—	—	—	—
12	23	1½	6	180	140/80	—	105	—	0.12	0.43	—	—	—	—
13	35	20	1½	210	150/100	—	107	—	0.12	0.42	—	—	—	SA
14	28	2	3	175	130/95	—	100	—	0.14	0.40	LVH	—	—	—
15	23	1	7½	175	130/80	—		P	0.12	0.46	LVH	—	—	—
16	39	20	1½	185	150/80	—	85	—	0.16	0.38	—	—	+	SA
17	21	6	12	180	120/90	—	107	—	0.12	0.36	—	—	+	SA
18	23	5	6	185	150/75	—	89	—	0.14	0.43	—	—	+	SA
19	18	4m	8	170	125/85	—	85	—	0.14	0.36	Rtaxis LVH	—	+	SA
20	21	3	8	190	130/80	—	111	—	0.18	0.41	—	—	—	—
21	20	9	9	170	130/90	—	79	—	0.14	0.40	LVH	—	+	SA
22	23	3½	6	205	160/80	—	93	—	0.14	0.42	—	—	+	SA
23	36	2	6	165	145/90	—	92	—	0.16	0.40	—	—	+	—
24	29	6	4	170	140/80	—	100	—	0.14	0.40	—	—	—	—
25	38	6	5	147	120/85	—	83	—	0.14	0.39	RR[1]	—	—	SA
26	28	10	6	160	130/80	—	100	—	0.14	0.37	—	—	—	—

Figure 2

in 10 subjects. One subject had inverted T waves in II, III, aVf, V_5, and V_6 at rest. Immediately after exercise, the T waves became upright in II and III and then inverted again 4 and 6 minutes after exercise (Figure 4). Another subject had terminal ST segment depression and biphasic T-waves after exercise (Figure 5). This subject had done twice the prescribed amount of exercise before these abnormalities were recorded.

Discussion

Of the 26 subjects included in this study, three had abnormal exercise electrocardiograms. One subject developed an arrhythmia after exercise (Figure 3); one subject had T wave inversion before exercise (Figure 4), which reverted to normal immediately after exercise; and one subject developed terminal depression of the ST segment with inversion of the T waves (Figure 5).

Of these three subjects, only the last developed changes which could be interpreted as possibly demonstrating myocardial ischemia. Other authors have found these electrocardiographic changes in apparently healthy athletes.[1, 3, 12, 13, 16] Many causes have been suggested,[7] including vagal coronary vasoconstriction,[13] muscular hypertrophy outstripping vascular supply, and asynchronous repolarization.[5]

The T wave inversion noted in the one subject at rest is of the innocent variety. It has been produced in young adults by many factors,[2] including emotional stress,[7, 15] autonomic dysfunction,[9, 14] and a full stomach.[7]

The arrhythmia which was produced was possibly on the basis of vagotonia.[1, 13] This phenomenon is not uncommon in young adults and is probably caused by an over-active parasympathetic nervous system,[10] depressing first the sinus node and then the AV node, so that sinus rhythm is followed by nodal rhythm and finally by an idioventricular rhythm.

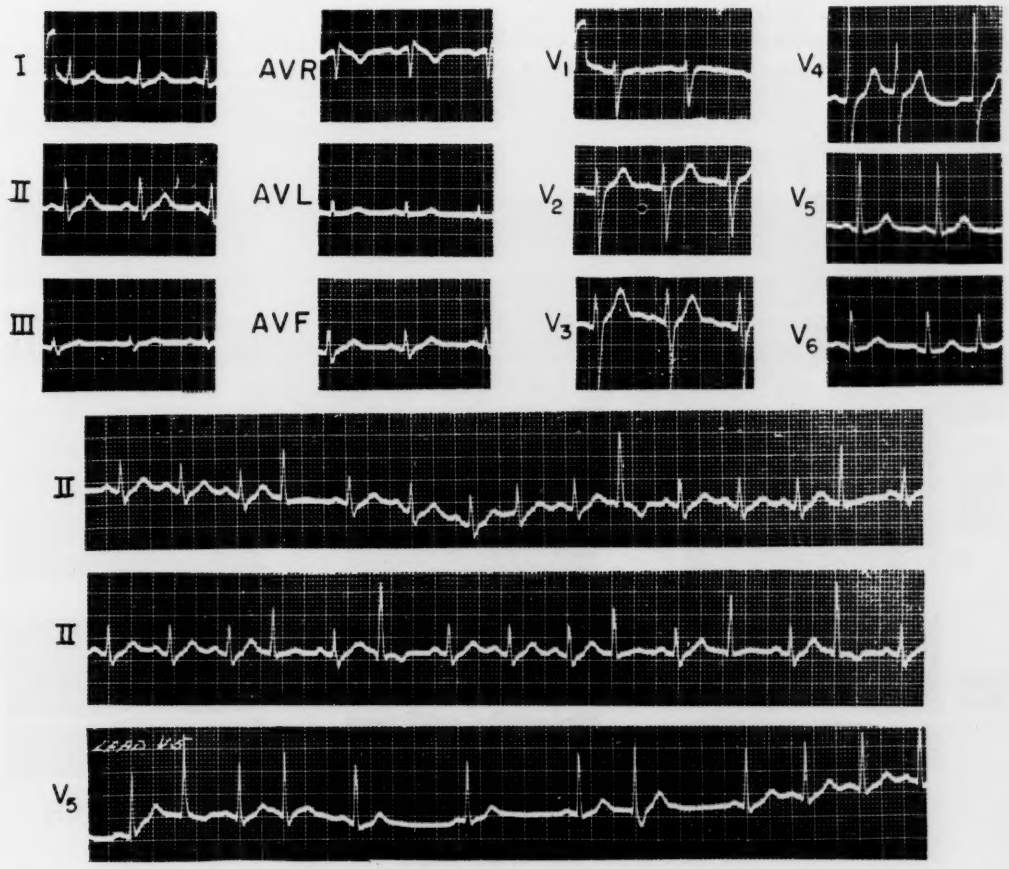


Figure 3. The standard 12-lead electrocardiograph was taken at rest. Leads II and V_5 were obtained after exercise, showing auricular and nodal prematurities and sinus arrest.

This group failed to demonstrate the bradycardia and prolongation of the P-R interval frequently reported in athletes.[1, 5] Weight-lifting does not involve the endurance effort of many other sports and probably does not produce the degree of physiological cardiac hypertrophy commonly seen in many athletes. It may be that sustained effort is required to develop these phenomena.

The men in this group all had marked muscular development of the pectoral muscles (Figure 1). However, no dampening effect of the thick muscle wall on the amplitude of the QRS complex was noted. In fact, five subjects were found to meet one of Sokolow and Lyon's criteria for the electrocardiographic diagnosis of left ventricular hypertrophy. This criterion was based on the absolute amplitude of the R wave and S wave in the V leads. None of these subjects had other criteria for the diagnosis of left ventricular hypertrophy, and none was thought to have left ventricular hypertrophy. The effect of the chest wall on the amplitude of the QRS complex in these subjects is conjectural. Athletes have been noted to have high amplitude QRS complexes and T waves.[6] The same relative percentage of abnormality was observed in 50 senior medical students studied here. This group, because of their relative physiological atrophy, was considered a suitable control group. In one respect only, namely in the greater amplitude of ventricular complexes at V_1 through V_6, did the group of weight-lifters differ from the group of medical students.

Conclusion

Of the twenty-six men who were examined, three were found to have abnormal electrocardiograms. These electrocardiographic changes were probably physiological adaptations well within the capacities of the normal heart.

Cardiovascular Laboratory
University of Kansas Medical Center
Kansas City 12, Kansas

Bibliography

1. Abagatta, R.: El electrocardiograma del desportista, Revista Pervana Cardiologica 1:135 (April-June) 1952.
2. Barrow, W. H., and Ouer, R. A.: Electrocardiographic changes with exercise, Arch. Int. Med. 71:547, 1943.
3. Boldrini, R., and Venerando, A.: Contributo allo studio delle modificazioni elettrocardiografiche nello sport, Folia Cardiologica (Milano) 21:37, 1954.
4. Cooper, E. L.; Sullivan, J. O., and Hughes, E.: Athletics and the heart, Med. J. of Australia 1:569, 1937.
5. Delachaux, A., and Rivier, J. L.: Abnormal electrocardiograms in athletes, Helvetica Medica Acta 15/4-5:424, 1948. (Excerpta Medica sect. 6, 3:3035, 1949, abstract.)
6. Doliopoulos, T., and Bangou, H.: L'electrocardiogramme unipolarie chez les sportifa, Cardiologia 22:169, 1953.

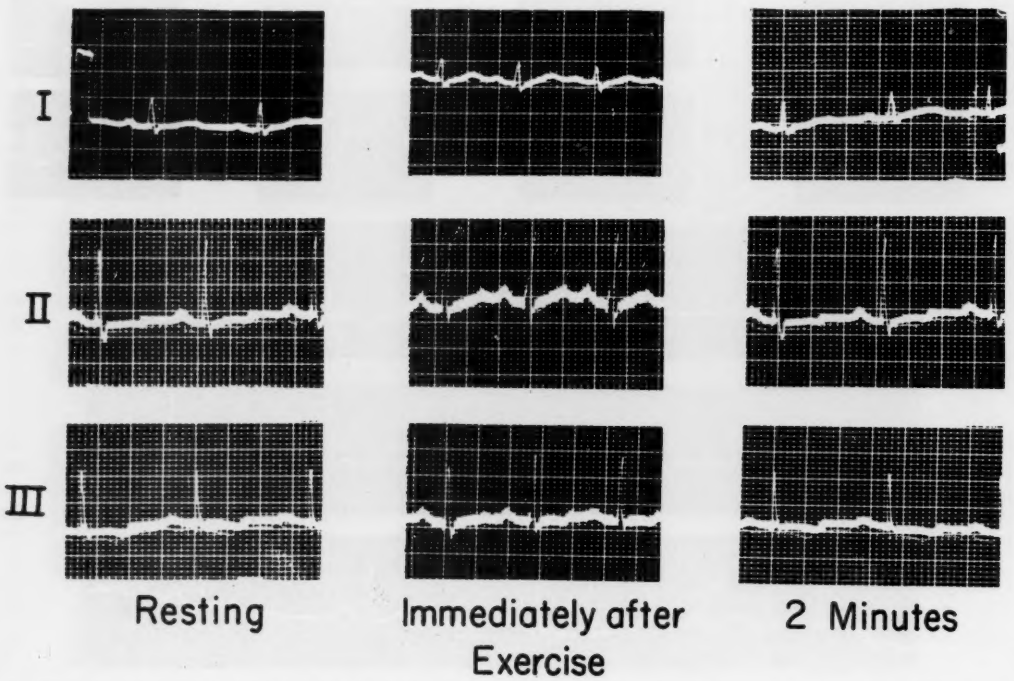


Figure 4. Electrocardiographic tracing of one subject who had inverted T waves at rest which became upright immediately after exercise and inverted again two minutes after exercise.

7. Hyman, A. S.: Clinical implications of electrocardiographic misinterpretation, N. Y. State J. of Med. 57/16: 2659, 1957.

8. Kissin, M.; Schwarzschild, M. M., and Bakst, H.: A normogram for rate correction of the QT_e interval of the EKG, Am. Heart J. 35:990, 1948.

9. Mellerowicz, H. I.: The ST segment in youths engaged in strenuous sports, Ztschr. Kreisl. Forsch. 42/3-4: 143, 1953. (Excerpta Medica sect. 6, 7:5559, 1953, abstract.)

10. Morton, D. R.; King, A. L., and Ferris, J.: Effects of intrathoracic vagal stimulation, Surg. Gynec. and Obst. 96:724, 1953.

11. Scott, R. C.; Seiwert, V. J.; Simond, D. L., and McGuire, J.: Left ventricular hypertrophy, Circulation 11:89, 1953.

12. Segers, M.; Regnier, M.; Hendrickx, Jr., and Boyodjian, N.: Analyse des electrocardiogrammes des 205 coureurs a pied., Bruxelles-Medical 36:1197, 1956.

13. Viciu, E.: L'interpretation des signes electrocardiographiques d'insufisance coronarienne chez les sportifs, La Presse Medicale 48:813, 1940.

14. Wasserburger, R. H., and Lorenz, T. H.: The effect of hyperventilation and probanthine on isolated RS-T segment and T wave abnormalities, Am. Heart J. 51:666, 1956.

15. Wendkos, M. H., and Logue, R. B.: Unstable T waves in neurocirculatory asthenia, Am. Heart J. 31:711, 1946.

16. Wolffe, J. B.: A critical evaluation of cardiovascular, biochemical, and other findings in marathon runners, Proceedings of the 10th International Congress of Sports Medicine, Belgrade, Yugoslavia, p. 368 (May) 1954.

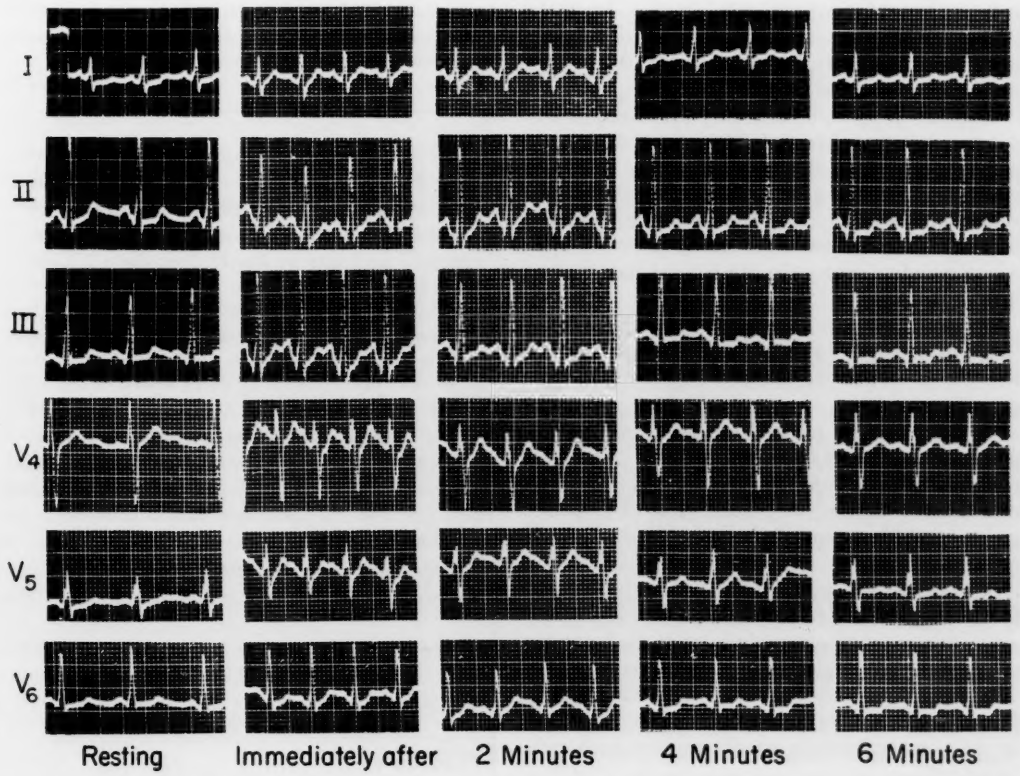


Figure 5. Resting and post-exercise tracings show terminal depression of the ST segment in Lead V_6 in the four- and six-minute post-exercise tracings.

CHANGES OF ADDRESS

Members of the Kansas Medical Society will receive the JOURNAL and correspondence from the Executive Office promptly only if correct addresses are on file. Report changes to Kansas Medical Society, 315 West Fourth Street, Topeka, Kansas.

Fluothane

Clinical Appraisal and Report of Its Use in 1,000 Cases

JOHN M. HANSEN, M.D.; JOHN I. DAVIES, M.D., *and* H. MALCOLM HARDY, M.D., *Kansas City*

It has been stated that one of the things urgently needed in anesthesia today is a potent nonexplosive inhalation compound.[1] Halogenation of hydrocarbons reduces flammability and may increase anesthetic potency, but substitution with chlorine or bromine tends to increase toxicity greatly, particularly to the liver and cardiovascular system.

Robbins[2] in 1946, investigating fluorinated hydrocarbons and ethers, concluded that six of these compounds might be of clinical value as they were nonexplosive and had greater therapeutic ratios than chloroform or ether, but their use was frequently complicated by intense hypotension, cardiac arrhythmias (including ventricular fibrillation), and skeletal muscle twitching.

In 1953 Krantz et al.[3] reported favorably on the safety of Fluomar (3) (trifluoro-ethyl-vinyl ether), but this compound was explosive in anesthetic concentrations.

In 1956 Suckling of England, while investigating non-explosive hydrocarbons, synthesized 2 bromo-2 chloro-1, 1, 1, trifluorethane (CF_3 CHCL BR). This compound was given the generic name of halothane and is available commercially under the trade name of Fluothane.

The pharmacology of this agent was investigated by Raventos,[4] and he concluded that it was a potent and safe agent with outstanding anesthetic properties and a therapeutic ratio at about twice that of ether. This drug has already been used extensively in England, Canada, and in this country. Many reports on its wide applicability in anesthesia have been published.[5-12]

Fluothane is non-inflammable and non-explosive in all concentrations of oxygen, air, or nitrous oxide. The agent is stable in the presence of soda lime, heat, and carbon dioxide. When exposed to light, Fluothane decomposes slowly, forming volatile acids. Decomposition is prevented by storage in amber colored bottles and by the addition of 0.1 per cent thymol.

This report deals with 1,000 administrations of Fluothane to 965 patients at the University of Kansas Medical Center by staff and resident anesthesiologists. Although the total number of administrations is not as large as in some series that have been published, it is felt that this series is representative of unselected anesthetic practice at large medical centers.

The true value of any new agent cannot be assessed until experience depicts its advantages and disadvantages. The administration of Fluothane 1,000 times, to 965 patients at the University of Kansas Medical Center, is reported here.

Patients' ages ranged from 6 hours to 93 years. Weight varied from 6 to 277 pounds. Five hundred and thirty-seven were males, 428 females. Sixty-three and nine tenths per cent were considered good risks, 29.0 per cent fair, and 7.1 per cent poor anesthetic risks. Duration of anesthesia varied between 5 and 495 minutes.

Preoperative abnormal conditions included most complications usually seen, including respiratory dysfunction, diabetes, thyrotoxicosis, advanced carcinoma, hypovolemia, shock, anemia, jaundice, poor liver function, decreased kidney function, emphysema, asthma, bronchitis, increased intracranial pressure, epilepsy, aortic stenosis, congenital heart disease, ad-

TABLE I

COMBINATIONS

Fluothane alone	166	16.6%
N_2O-O_2 and Fluothane	157	15.7
Pento. and Fluothane and O_2	56	5.6
Pento. Fluothane and N_2O	421	42.1
Fluothane and Ether	174	17.4
Miscellaneous	26	2.6
	1000	100.0%

From the Section of Anesthesiology, University of Kansas Medical Center.

Acknowledgement is given to the expert technical assistance of Mr. Steve Angell and thanks to Ayerst Laboratories which provided the Fluothane used.

vanced arteriosclerosis, and moderate and severe hypertensive heart disease.

There were 14 postoperative deaths. Fluothane as an anesthetic agent was considered contributory in one. The agent was used for a wide variety of surgical procedures including intracranial, intrathoracic, intracardiac, abdominal, ophthalmic, dental cases, etc. No premedication was used in 125 patients. The remainder received the usual pre-anesthetic medication including atropine in 508 cases and scopolamine in 367. Supplemental intravenous atropine during anesthesia was given to 34 patients.

The combinations used are illustrated in Table I. Techniques are outlined in Table II, and types of machines for semi-closed technique in Table III.

Results

Induction: Induction with Fluothane was smooth, rapid, and free from coughing, straining, salivation, or laryngospasm, even in unpremedicated patients. Pharyngeal and laryngeal reflexes were quickly obtunded.

Surgical anesthesia was attained in 1 to 12 minutes (average 3.6 minutes) when Fluothane alone was used, and in 3 to 12 minutes (average 4.4 minutes) following a "sleep" dose of Pentothal. Muscle tone was quickly abolished, relaxation of the jaw being particularly good. Satisfactory condition for endotracheal intubation was readily obtained and patients were easily intubated under Fluothane alone, the only disadvantage being rapid emergence from anesthesia. Relaxation was unsatisfactory for abdominal surgery.

TABLE II

TECHNIQUES

Open	167	16.7%
Closed	8	.8
Semi-closed	665	66.5
Anesthesia Maintained by Insufflation	32	3.2
Combinations (Open-semi-closed)	128	12.8
	1000	100.0%

Signs of deepening anesthesia were similar to those seen with ether, but the relatively early onset of quiescence was sometimes misleading unless careful observations of respiratory movements and eye signs were also made. It was found that the pupils were large during the induction period but became small when light surgical anesthesia was attained. The pupils enlarged slightly as anesthesia deepened but were never fully dilated even during anesthesia pushed to respiratory arrest.

Salivation was troublesome in only one case. When secretions had been noticed prior to the induction, administration of Fluothane resulted in a suppression of secretory activity even in unpremedicated patients.

Fluothane is the most potent inhalation anesthetic agent we have today. It is almost twice as potent as chloroform, according to Raventos.[4] Raventos has also shown that the blood-level of Fluothane changes rapidly with changes in concentration of the drug in the alveoli, and that the solubility of Fluothane in the tissues of the body is low, in contrast to that of ether. Hence changes in alveolar Fluothane concentrations are rapidly reflected in the blood and central nervous system concentrations of the drug, compared to the much longer time lag in the case of ether, and thus a greater safety margin. For these reasons small variations in the inhaled concentration of Fluothane are critical and cause rapid and marked changes in the depth of anesthesia. Some of the methods and apparatus used in administration of older inhalational agents have been found unsatisfactory when used to administer Fluothane. New equipment has been designed to administer this potent agent more safely and easily.

TABLE III

TYPES OF MACHINES FOR S. C.

Heidbrink	522	78.5%
McKesson	40	6.0
Foregger (drip)	37	5.6
F. N. S.	39	5.9
To & Fro	8	1.2
Infants Circle Abs.	19	2.8
	665	100.0%

In this series of cases Fluothane was administered with all the standard techniques for inhalation anesthesia (See Tables I, II, and III). It quickly became evident that Fluothane anesthesia was safe, and the depth of anesthesia easily controllable, only when a method was used which permitted known small concentrations of vapor, accurate to within 0.1 per cent, to be given to the patient in the inhaled gas mixture. This confirms the work of other investigators.[10, 13, 14, 15, 16]

In those cases in which a calibrated vaporizer was used, the concentration of Fluothane needed to maintain surgical anesthesia varied between 0.7 per cent and 2.4 per cent with an average of 1.6 per cent. In no case was it necessary to give more than 3 per cent, even for induction. If uncalibrated vaporizers are

used, much larger concentrations than this may suddenly be delivered into the system, since Fluothane is extremely volatile at room temperatures. This risk is heightened when warm soda-lime is present in the system. These undesirable high concentrations may cause profound respiratory depression, bradycardia (especially in the inadequately atropinized subject), a dramatic fall in blood pressure, and cardiovascular collapse with possibly cardiac arrest.

It is essential that the vaporizer be so placed in the anesthetic circuit that it is not subjected to fluctuations in the volume of gas passing through it. This means that the vaporizer must be situated distal to the gas flowmeters of the anesthetic machine through which a known volume of gas is flowing, and proximal to the circle or to-and-fro portion of the system. If it is positioned in a circle or to-and-fro system between the rebreathing bag and the patient, the gas volume passing through the vaporizer, and hence the Fluothane vapor concentration, will vary greatly, to an unknown and dangerous extent, with alteration in the rate and depth of the patient's respiration.

The dangers of building up lethal concentrations in the system will be much increased with this type of circuit if assisted or controlled respiration is being employed.

We have found in this investigation that the most dangerous and potentially lethal method of administering Fluothane is to use it in a completely closed circuit. This agrees with the observations of other workers who have used Fluothane extensively in clinical practice.[6, 8, 9, 10, 15, 16, 17, 18, 19, 20] The only reported exception to this is the work of Marrett.[21] Using a standard Marrett anesthetic machine, he has given Fluothane in a closed circuit to over 1,500 patients without a single death either during anesthesia or during the postoperative period. Vapor concentrations, as Brennan et al.[18] have shown, may quickly reach several times the lethal concentrations in these circumstances. Indeed it would appear certain that all the reported deaths occurring during Fluothane administration have been due to errors of technique resulting in overdosage followed by severe hypotension, apnea, and finally cardiac arrest, rather than to any inherent pharmacological defect in the drug.

Fluothane is expensive, and it would be more economical if it were practical and safe to use it in a closed system. Fluothane was given to eight cases, using a closed circuit, but in each case, in spite of great care, it was difficult to control the depth of anesthesia and prevent the patients from reaching too deep a plane of anesthesia.

Fluothane vaporizers now available are:

1. The "Fluotec" Fluothane Vaporizer. This is calibrated from 0.5 per cent-3.0 per cent vapor concentrations and is accurate to within 0.05 per cent throughout this range.[13] An incorporated thermostat automatically compensates for any temperature variation between 60°F and 90°F, and a gas control valve insures consistent results for any given setting of the control dial when gas flows from the flowmeters between 4 and 15 liters per minute are used.

2. The "F.N.S." Fluothane Vaporizer. This is calibrated from 0.0 per cent-4.4 per cent vapor concentrations at 4 liters gas flow per minute at 77°F.

3. Ohio-Heidbrink Fluothane Vaporizer. This is calibrated from 0.0 per cent-3.0 per cent vapor concentrations at 4 liters gas flow per minute at 75°F.

4. Foregger Copper Kettle. This apparatus may be used to give accurately known, constant concentrations of Fluothane. Tables are available giving vapor concentrations delivered, using different gas flows. This instrument is not so simple or convenient to use as one of the other vaporizers in which vapor concentrations are calibrated directly on a dial.

The safest way to administer Fluothane is to use one of these vaporizers in conjunction with a non-rebreathing technique. A non-rebreathing valve may be used in the circuit to achieve this. The big drawback to this method is that it is expensive, using relatively large amounts of Fluothane and high gas flows. However, it does avoid any possibilty of concentrations of Fluothane building up to dangerously high levels in the circuit.

The type of calibrated vaporizer that first became available to us was the F.N.S. Fluothane Vaporizer. This vaporizer was used in 39 cases with a semi-closed circle, or to-and-fro, system, and a fresh gas flow of 4 liters per minute. It was found that, with this flow, to maintain a patient in surgical anesthesia, approximately 13 cc. per hour of Fluothane were vaporized. Subsequently, in over 300 cases, the F.N.S. vaporizer has been used and has performed well.

Before obtaining an F.N.S. vaporizer, Fluothane had been administered to more than 500 patients with the circle system of a Heidbrink machine. The Fluothane was placed in the ether vaporizer bottle situated on the inspiratory side of the circle. The wick was removed from the vaporizer, and a gas flow of 2 liters per minute was used. This method did not prove satisfactory as there was no close control of the vapor concentrations in the system and a "swinging level of anesthesia" resulted.

However, when using a calibrated vaporizer, it is a great mistake to rely too much on the settings of the controls of the machine to the neglect of the patient's physical signs. Both must be observed if mistakes are not to be made.

For the same reasons, in babies and small children,

Fluothane is now administered by means of a calibrated vaporizer, and an infant circle, or to-and-fro, absorber rather than inducing the child with open-drop Fluothane.

Previously children had been induced with open-drop Fluothane. Because little is known about vapor concentrations under the mask with this technique, it was felt that it was too dangerous for routine use. Although induction was smooth, more rapid than with vinyl ether, associated with little excitement, and remarkably free of secretions, on several occasions within 20 to 30 seconds of the start of induction respiration became deeply depressed, there was a marked slowing of the pulse, and a fall in blood pressure. These are signs of a severe over-dosage of drug. It is felt that, if open-drop induction is indicated, vinyl ether is still the agent of choice, since, although induction is slightly slower and secretions are stimulated more than when using Fluothane, it is safer under these conditions.

Although Fluothane is a potent anesthetic, it became apparent during this series that it is not a powerful analgesic. For this reason the gas mixture that was used when giving Fluothane was 50 per cent N^2O and 50 per cent O_2. This meant a flow of 2 liters N^2O and 2 liters O_2 per minute when using the F.N.S. Vaporizer. It was found that small doses of meperidine (10 to 25 mgm.) introduced intravenously were useful in controlling tachypnea which was seen in 179 patients, most of whom were children.

The majority of adult patients were induced with a sleep dose of Thiopentone followed by N_2O, O_2 and Fluothane. The average vapor concentration needed for maintenance was 1.6 per cent. Using Fluothane for induction required 2.0 per cent to 3.0 per cent vapor concentration, this amount being reduced for maintenance.

Respiration

Respiratory rate was unchanged in 648 patients.

The rate was decreased in 75 patients, and a tachypnea was seen in 179 patients. This increased rate was similar to the tachypnea seen with trichlorethylene. In seven patients, a rate of over 50 per minute was recorded. Tachypnea was seen mainly in children, only rarely in adults after Pentothal induction or intravenous administration of Demerol. Apnea was produced intentionally 12 times but unintentionally 15 times. Controlled respiration was used in 104 patients. Respiration was easily controlled and lung compliance appeared to be increased. This is suggestive of a bronchodilatation.

Cardiovascular System

Within a few minutes of induction of anesthesia, the skin was noted to be flushed, warm, and dry, superficial limb veins became prominent, and conjunctival vessels became suffused. These changes were more marked than with other agents and are highly suggestive of a partial sympathetic ganglion block.

An increase in pulse rate was recorded in 133 patients and a decrease in 275. It was not found that premedication with atropine gave a significantly lower incidence of bradycardia.

Intravenous administration of atropine during anesthesia to 34 patients partially corrected an existing bradycardia seven times.

Electrocardiographic Findings

In 23 cases a continuous direct writing electrocardiogram was obtained, before operation, during induction, and until Fluothane was discontinued. One case showed A-V nodal rhythm before induction which changed to sinus rhythm during induction and back to nodal rhythm during endotracheal intubation. A second showed premature auricular contractions with bigemini before any anesthetic, which changed after intubation to sinus rhythm, only to revert back to auricular prematurities and bigemini ten seconds after intubation.

Five others showed changes during administration, three with nodal rhythm and two with premature auricular contractions.

The other 16 showed no electrocardiographic changes, one case being of interest in that an inadvertent overdosage of Fluothane was given just after intubation, producing respiratory arrest with no palpable pulse. However, there was no alteration in the electrocardiogram, and the pulse returned within two minutes while the patient was ventilated with 100 per cent O_2. Blood pressure studies were made in 666 cases in which 328 were unaffected. Changes attributed to other factors were demonstrated in 90 cases. In 29 patients there was a rise in blood pressure, and in 219 there was a fall in blood pressure. The pressure fell more than 40 mms. Hg. in 38 patients. The fall seemed to be directly related to the concentration of Fluothane, condition of the patient, and other agents used; it was quickly reversed by lightening the level of anesthesia.

Methedrine proved more effective than Vasoxyl in treating hypotension, but intravenous atropine was ineffective. Hypotension was found to occur more readily in hypertensive patients, where hypovolemia or anemia was present before operation and following the administration of moderate doses (over 300 mg.) of Pentothal for induction. If bleeding occurred during operation, a greater fall in blood pressure resulted than would usually be anticipated. Premedication with atropine afforded no protection from hypotensive episodes.

Doses of curare, less than 10 mgms., did not aggravate the tendency to hypotension, but doses greater than 15 mgms. were associated with a fall of over 40 mgms. Hg. in four patients. Perhaps this is due to the ganglionic blocking effects of curare. Other commonly used muscle relaxants did not appear to directly affect the blood pressure. Small amounts of subcutaneous epinephrine were given to 39 patients and caused a transient rise in pulse rate in 14. No arrhythmia was detected, but Stephen has warned of the possible dangers in using epinephrine with Fluothane.

Postoperative Period

Recovery from anesthesia was usually rapid and free from excitement. Protective reflexes returned on an average of 4.68 minutes and movement on command in about 10 minutes.

Nausea or vomiting was seen in 6.2 per cent, easily controlled by usual postoperative medication.

Hypotension was seen in 35 cases in the immediate postoperative period. Twelve patients produced small volumes of concentrated urine, and 5 of these needed catheterization. The significance of these findings is not apparent, but it was noted during ureteric catheterization that deep Fluothane anesthesia suppressed urine production in five patients without lowering blood pressure. Fluothane did not seem to affect other metabolic processes.

One patient who received Fluothane 17 times during a period of seven weeks showed no clincial evidence of kidney or liver injury.

There were 14 postoperative deaths. Fluothane was considered contributory in one case and is the basis of a separate report.

Advantages

Non-Explosive

May be used with soda lime

Potent—rapid induction and recovery

Suppression of salivary and bronchial secretions

Non-irritant

Allows respiration to be easily controlled

Low incidence of nausea and vomiting

Low incidence of postoperative hypotension and shock.

Disadvantages

Relatively poor analgesia

Cardiovascular depression

Respiratory depression or tachypnea in light anesthesia—apnea in deeper planes

Possibly dangerous with epinephrine and norepinephrine

Requires special vaporizer.

Section of Anesthesiology
University of Kansas Medical Center
39th and Rainbow
Kansas City 12, Kansas

References

1. Stephen, C. R.: Editorial, Survey of anesthesia, 1 (3): 184, 1957.

2. Robbins, B. H.: Preliminary, studies of the anaesthetic activity of fluorinated hydrocarbons, J. Pharmacol. and Exper. Therap. 86:197, 1946.

3. Krantz, J. C.; Carr, C. J.; Lu, G., and Bell, F. K.: The anesthetic action of tri-fluoroethly-vinyl ether, J. Pharmacol. and Exper. Therap. 108:488-95 (August) 1957.

4. Raventor, J.: The action of fluothane: a new volatile anaesthetic, Brit. J. Pharmacol. 11 (4):394-410 (Dec.) 1956.

5. Johnstone, M.: The human cardiovascular response to fluothane anesthesia, Brit. J. Anaesth. 28 (9):392-410 (Sept.) 1956.

6. Bryce-Smith, R., and O'Brien, H. D.: Fluothane: a non-explosive volatile anaesthetic agent, Brit. Med. J. 2:969-72 (Oct. 27) 1956.

7. Stephen, C. R.; Bourgeois-Gavardin, M.; Fabian, L. W.; Grosskreute, D. C.; Dent, S., and Coughlin, J.: Fluothane: a preliminary report, Anesthesiology 18 (1): 174-5 (Jan.-Feb.) 1957.

8. Chang, J.; Macartney, H. H., and Graves, H. B.: Clinical experience with fluothane: a new non-explosive anaesthetic agent, Can. Anaesth. Soc. Soc. J. 4 (3): 187-206 (July) 1957.

9. Hudon, F.; Jacques, A.; Clavet, M., and Houde, J.: Clinical observations on fluothane anaesthesia, Can. Anaesth. Soc. J. 4 (3): 221-34 (July) 1957.

10. Mackay, I. M.: Clinical evaluation of fluothane with special reference to a controlled percentage vaporizer, Can. Anaesth. Soc. J. 4 (30): 235-45 (July) 1957.

11. Stephen, C. R.; Grosskreutz, D. C.; Lawrence J. H. A.; Fabian, L. W.; Bourgeois-Gavardin, M., and Coughlin, J.: Evaluation of fluothane for clinical anaesthesia, Can. Anaesth. Soc. J. 4 (3): 246-58 (July) 1957.

12. Junkin, C. I.; Smith, C., and Conn, A. W.: Fluothane for paediatric anaesthesia, Can. Anaesth. Soc. J. 4 (3): 259-64 (July) 1957.

13. Brennan, H. J.: A vaporizer for fluothane, Brit. J. Anaesth. 29 (7): 332-3 (July) 1957.

14. Bryce-Smith, R., and O'Brien, H. D.: Some observations on fluothane, Pro. Roy. Soc. Med. 50:193-7 (March) 1957.

15. Fluothane: Report to medical research council by committee on non-explosive anaesthetic agents, Brit. M. J. (Aug. 31) 1957.

16. Stephen, C. R.; Lawrence, John H.; Fabian, L. W.; Bourgeois-Gavardin, M.; Dent, S., and Grosskreutz, D. C.: Clinical experience with fluothane—1400 cases. Anaesthesiology 19 (2): 197-207 (March-April) 1958.

17. Brindle, G. F.; Gilbert, R. G. B.; and Millar, R. A.: The use of fluothane in anaesthesia for neurosurgery; a preliminary report, Can. Anaesth. Soc. J. 4 (3): 265-281 (July) 1957.

18. Brennan, H. J.; Hunter, A. R., and Johnstone, M.: Halothane, Lancet 2:453-7 (Sept.) 1957.

19. Pittinger, C. B.; Cullen, S. C., and Watland, D. C.: Observations of a new anaesthetic agent: fluothane, paper (Feb.) 1957.

20. Johnstone, Michael: A clinical assessment of halothane (fluothane), Anaesthesia 13 (2): 196-7 (April) 1958.

21. Marrett, H. R.: Halothane: its use in closed circuit. Brit. M. J. 2:331-3 (August) 1957.

Cerebral Palsy

The Need for Reevaluation of Obsolete Concepts

CHARLES M. POSER, M.D., ***Kansas City***

In 1861, almost 100 years ago, William Little first described many of the crippling conditions which are now generally referred to by the term "cerebral palsy." He pointed out the need to investigate obstetric and neonatal situations and their relation to the child's mental and physical health.

In a masterful monograph published in 1897, Sigmund Freud reviewed all the known factors in these conditions and invoked others that might cause neurologic disability in the child. Physicians have long known that "cerebral palsy" or "Little's disease," does not represent a single disease entity, yet they have continued to characterize children by these terms while paying little attention to the etiology of the individual's disability. The result has been an increasing divergence in therapeutic methods, leading to confusion in therapy for a particular case.

Many attempts have been made to restrict the use of the term "cerebral palsy" to a particular group of patients. Phelps defined the expression as "a group of conditions which affect the control of the voluntary motor system and have their origin in lesions of various parts of the brain." Using this definition, both progressive and non-progressive disease of a developmental, traumatic, neoplastic, vascular, or even infectious nature could be included.

Kurland stated that the term cerebral palsy refers to those disorders of uncertain or unknown etiology arising during the perinatal period—that is from conception to the end of the neonatal (first month) period—affecting the motor function of the brain and in which the dysfunction is recognized prior to the end of infancy (two years). According to this concept, "cerebral palsy" is a more limited but still a miscellaneous category; it is essentially a diagnosis of exclusion.

Merritt stated his opinions succinctly when he said, "Cerebral palsy is a heterogeneous group of cases with damage to the nervous system in utero, at birth, or in early life—but not a disease entity."

The term "cerebral palsy" is a poor descriptive one, since it means simply that there is paralysis or weakness, presumably of cerebral origin.

The primary problem of the "cerebral palsy" or, better, the "special pediatric" clinic, is that of correct diagnosis, since children come to the clinic affected in many different ways by many different etiological agents. It is not absolutely correct to state that in all cases of "cerebral palsy" the central nervous system itself is involved, since children with muscular dystrophy or even orthopedic conditions are frequently encountered in such clinics.

Over the years systems of classification of the different types of "cerebral palsy" have been evolved. Phelps's classification is still widely used. He divided cases into five groups: those affecting the cortex, those affecting the basal ganglia, the ataxias (cerebellar), the tremors, and the rigidities. This purely descriptive classification is of limited usefulness since it takes into account only the site of the lesion and not the possible etiology. In terms of possible therapeutic measures, it is far from satisfactory.

Problems presented by children in special pediatric clinics should be studied by a team of specialists. Only through knowledge of each child's disease and potential can proper therapy be planned.

What, then, are the possible etiologic agents causing crippling disease in children seen in special pediatric clinics? They run the gamut of traumatic, metabolic, infectious, vascular, neoplastic, and congenital diseases. The physician's task is to determine if possible the *time* of the lesion: whether it occurred during the perinatal or postnatal period. A detailed history of the pregnancy is as important as a complete account of the obstetric situation. It is too often forgotten that difficult deliveries are frequently the result of a malformed child, rather than the reverse. This has great significance in terms of counseling with regard to the management of subsequent pregnancies.

The term "congenital" is one that is so frequently used in categorizing diseases that it needs some definition. "Congenital" means "existing at birth." It is a too-inclusive word with little meaning which is often used interchangeably with "familial" and "heredi-

Section of Experimental Neurology, University of Kansas School of Medicine.

tary." To be truly hereditary, a disease must be genetically determined at the time of conception. It must be the result of the interaction of the genes present in the sperm and ovum unaffected by the environment.

Sir Archibald Garrod's original inborn errors of metabolism: albinism, alkaptonuria, cystinuria and pentosuria, and many others since described, are examples of such conditions. These need not necessarily be familial since only one of the offspring may be affected by the disease and the others not.

Kernicterus, although the result of interaction of genetic factors, should not be classified in the same group since it is an environmental factor that causes the disease, i.e. the mother's reaction to the antibody contained in the fetal blood which is at the root of the pathological factors, not a direct genetic influence.

The mother's genetic make-up may affect her offspring indirectly. It has been shown that diabetes probably represents a genetically determined disease; therefore, a diabetic mother may affect the child by modifying intra-uterine conditions. The same can probably be said about mongolism as the result of the age of the mother, or uterine exhaustion, and probably other still unknown factors. Certainly it is now recognized that intra-uterine infection caused by German measles or toxoplasmosis may result in a malformed or retarded child.

Hereditary diseases may be familial, but not all familial diseases are hereditary. The fact that the same disease affects siblings is not proof that it is inherited or genetically-determined. Kernicterus may be familial, as may any disease which is the result of environmental factors affecting intra-uterine life if such factors remain operative in more than one pregnancy.

Anoxia or intracranial hemorrhage, either spontaneous, the result of intra-uterine conditions, or the result of obstetrical trauma, will also give rise to conditions which may be indistinguishable from those resulting from agenesis of various parts of the brain. The children of a myasthenic mother are examples of how varied the effects may be; a child may be truly myasthenic, or a newborn child may be temporarily myasthenic, probably as the result of having in its system a cholinesterase-like or a curariform-like substance from the mother, or it may be completely normal. All these conditions are in one sense "congenital," but to stop at this point in characterizing them is to miss the possibility of discovering a remediable condition in the mother or advising the parents about further progeny.

Attention must also be paid to the problem of progressive versus nonprogressive disease, and to the differentiation between true progression and pseudoprogession of the disease. In many instances, the child's deficit becomes more apparent as he grows. This may be evidence of increasing disability caused by progression of the disease process, but more often than not it is simply due to the fact that the growing child makes more and more demands upon his basic mental and physical endowment.

If this endowment is deficient, it cannot meet the new requirements, and thus the disability appears to be greater. Many children do not manifest their disease until they begin to walk or talk. There are, however, true progressive diseases better called true degenerative diseases, such as the lipidoses or diffuse sclerosis or leucodystrophy. In those diseases the pathologic process increases the deficit in the same way that a neoplasm increases in size, and with the same results.

Certain hereditary disorders such as muscular dystrophy or the spino-cerebellar ataxias (for instance, Friedreich's ataxia) may become manifest several years after birth, frequently in late childhood or adolescence. Others, such as myotonia dystrophica, may not appear until adulthood; while still others, such as Huntington's chorea, may wait until middle age to become apparent. Thus normal early development does not necessarily mean freedom from neurologic disease of a congenital nature. Normal early development is the rule, in some conditions, such as the cerebral sclerosis of Schilder, and leucodystrophies, the leucoencephalitides, and the lipidoses. The time of onset of the disease is of little value in determining whether or not it is heredo-degenerative.

In evaluating possible therapeutic measures, this differentiation is of the utmost importance. In gauging the child's normal development, it may be redundant to point out that the usual landmarks of sitting, standing, walking, and talking are nothing more than statistical averages and the late sitter or walker may be perfectly normal, while the child with definite brain damage may reach these landmarks at the proper time, or even early. It is extremely difficult in many instances to evaluate properly the status of a child in infancy, and a period of observation of six months to a year without heroic corrective therapy may, in the long run, be the more beneficial course to follow.

The importance of correct early diagnosis, however, cannot be over-emphasized since in many conditions encountered in the special pediatric clinic there are direct, specific therapeutic measures available. Unfortunately, the condition is too often beyond help by the time the child is seen by competent specialists. The burden thus lies squarely upon the general practitioner or pediatrician for early recognition and institution of therapy or referral to the competent specialist.

For too long a time the view has been held that the brain damaged child needs the care of the orthopedic

surgeon and no one else. The orthopedic surgeon is of immense help when the proper therapy consists of surgical muscle or tendon transplant or joint stabilization, in other words if the basic defect is indeed an orthopedic one. Orthopedic measures, however, are usually and properly late interventions.

The proper way of arriving at the diagnosis in the disabled child is through the team-approach. The pediatrician, the neurologist, the neurosurgeon, the orthopedic surgeon, the plastic surgeon, the radiologist, the psychiatrist, the psychologist, the ophthalmologist, the otologist, the speech therapist, the physiatrist, and the dentist are all indispensable. It is only after the child has been seen by all the appropriate members of the team, and after a battery of specific laboratory tests, that his ailment can be diagnosed and the necessary therapeutic measures instituted.

Completely remediable conditions are frequently seen in special pediatric clinics and can be arrested or cured if intervention is early enough. Certain cases of hydrocephalus, certain benign intraspinal or even intracranial tumors, subdural hematomas, diastematomyelia, certain intracranial vascular anomalies, premature synostosis, and other such disorders must be diagnosed as early as possible. Myasthenia gravis and some forms of metabolic disturbances such as phenylketonuria and galactosemia if treated early present a good possibility for improving the prognosis.

Another great problem, often overlooked in the child with brain damage regardless of etiology, is the presence of concomitant abnormalities which might respond to therapy. In special pediatric clinics, between one-third and one-half of the children have convulsive disorders. Repeated convulsions may severely injure the brain, and an otherwise normal child may become hemiplegic or even decerebrate following status epilepticus. An uncontrolled convulsive disorder will frequently impair a child's progress and give the examiner a distorted appreciation of his rehabilitation potential. Control of convulsive disorders *must* be an integral part of the treatment program.

Another extremely important factor in evaluating the child is discovering his mental aptitude. From figures published by many special pediatric clinics it appears that at least 50 per cent of the children are mentally retarded, and a large percentage of those are severely retarded. This is a point that must not be overlooked in planning a therapeutic and training program for the child.

Unfortunately, specific medical or surgical therapeutic measures are applicable only to a small percentage of the patients in special pediatric clinics. This leaves a large group in whom treatment must be symptomatic and supportive. In planning for such children, the first criterion that should be applied is related to potential response to training. The second one is that of the practical goal of therapy and training. In order to evaluate these two factors, it is necessary to look into the background of a large number of special pediatric clinics.

In many communities lay groups are formed by parents and relatives of so-called "cerebral palsied" children who give generously of their time and money for the support of clinics. There are also national organizations of this type which foster research programs in addition to supporting patient care. There can be no question but that the motivation of these organizations is good. There is, however, some doubt as to the validity of their goals. It is a sad if not always recognized fact that not every child who is retarded or brain-damaged will necessarily profit from therapy or training.

It may be harsh to tell a mother right from the start that no amount of surgery, education, or physical and occupational therapy presently available will make her child sit up or walk or talk; but isn't it equally heartless to have to tell this same mother, several years and many thousands of dollars and man-hours of therapy later, that there really is no known hope for her child? Too often parents have concentrated all their affection upon the disabled child, neglecting their other children, or have even decided not to have any more children because of absent or erroneous eugenic advice based on incomplete or incorrect diagnosis.

Parental and organizational pressure upon many clinics to accept all disabled children for treatment often makes the proper selection of patients for optimum therapeutic effort an extremely difficult task, yet this selectivity is the clue to proper treatment and training. In this connection the services of the social worker are invaluable. There is not, and in the foreseeable future probably will not be, enough money, time, and personnel to give proper care and training to all children who come to special pediatric clinics. The selection of patients must be based solely upon strictly medical considerations: the diagnosis and the child's potential, especially in terms of his mental endowment. For example, it is pointless for a speech therapist to spend many hours teaching a few words to a child with an IQ of 20. It is equally purposeless to try to teach a child to walk if he cannot even be toilet-trained because of severe brain damage.

Selection of the patient must go hand in hand with goals of therapy, since the two are dependent upon each other. For some children, therapy and training must be limited to making the problems of institutional care easier. For others, it must be gauged in terms of potential mental and physical ability.

The problem of the child with spastic diplegia

often presents a good example of what might be called "unrealistic therapeutic effort." Experience in World War II with thousands of paraplegics has shown that persons handicapped in this way can be trained to lead useful and relatively normal lives in wheel chairs. With special automobiles, with relatively minor modifications in the home, thousands of men have resumed productive lives, have married, and engaged in a wide variety of employment and recreational activities.

This knowledge seems to be unknown in many special pediatric clinics where thousands of hours and dollars are spent in orthopedic operations, corsets, and braces—not counting the patient's suffering—with the result that the patient, loaded down with heavy and ungainly apparatus, can usually, with the help of crutches, drag himself awkwardly from his wheel chair to the dinner table. This is *not* "rehabilitation." In the course of attempting the useless standing posture and walking, the handicapped child has been denied the training that could have been achieved more realistically by confining him to a wheel chair and utilizing to the utmost his upper extremities, which are now encumbered by crutches.

Standards for training are often too rigid and unrealistic in other areas. Schooling is important, but the goals to be reached should be decided upon in advance. If a child cannot learn how to read and write and do simple arithmetic, it is not at all inconceivable that he might learn how to run an elevator, drive a tractor, take care of cattle, or even be a passable automobile mechanic. The goal should be to make the individual self-supporting to the degree that his intellectual endowment allows.

Each child who is seen in the special pediatric clinic presents a special problem. Only a thorough evaluation by a competent team of specialists can answer the five basic questions which must be asked in every instance: What is the cause of the disability and what can be done to remedy it? What advice should be given the parents concerning further pregnancies? What is the child's potential in terms of training, and what are the realistic goals of therapy and rehabilitation in this child?

Section of Experimental Neurology
University of Kansas Medical Center
39th and Rainbow
Kansas City 12, Kansas

Bibliography

1. Francisco, W. D.; Byrne, M. C., and Elkin, M. T.: Cerebral palsy, J. Kans. M. Soc. 57:413, 1956.
2. Freud, S.: Die infantile cerebrallähmung, Spec. Path. u. Ther. 9 (part 2):1, 1897.
3. Fuldner, R. V.: Cerebral palsy: where next? A.M.A. Arch. Neurol. Psychiat. 74:267, 1955.
4. Heyl, H. L.: Some practical aspects in the rehabilitation of paraplegics, J. Neurosurg. 13:184, 1956.
5. Kurland, L. T.: Definitions of cerebral palsy and their role in epidemiological research, Neurology 7:641, 1957.
6. Little, W. J.: On the influence of abnormal parturition, difficult labors, premature birth and asphyxia neonatorum on the mental and physical condition of the child, especially in relation to deformities, Tr. Obst. Soc. London 3:293, 1861.
7. Merritt, H. H.: A Textbook of Neurology. Philadelphia, Lea and Febiger, 1955.
8. Phelps, W. M.: Cerebral palsy, J. Iowa M. Soc. 38:509, 1948.
9. Poser, C. M., and Miller, F. R.: Mental deficiency, J. Kans. M. Soc. 59:356, 1958.
10. Wallace, H. M.; Losty, M. A.; Sanders, D.; Siffert, R. S.; Tobis, J. S., and Rich, H.: Children with cerebral palsy: cost of care and results in 770 children, Pediatrics 20: 703, 1957.

The number of books that have appeared since the invention of printing runs into the millions. The Library of Congress has more than 10 million books within its walls, and more than 14 million letters, manuscripts and private documents. The scope that is open to the collector of the written word is obvious.

It is through books that we acquire our basic education, and books are certainly the most persistent element of our civilization, the most pervasive, and still the most efficient means for the transmission of knowledge from generation to generation. A book is a medium, a means to an end, a tool one need only grasp to have at one's command.

—*Anthony Benis*

Chest X-rays

Analysis of Data from Reading and Re-Reading Films

WILLIAM SEEMAN, Ph.D., *Kansas City*

This paper is presented in an attempt to clarify some aspects of a study by Garland and Cochrane in the reading of chest x-rays. In that study, which appeared in the *Journal of the American Medical Association* about six years ago, 89 x-ray films (size 14 x 17 in.) were read by each of six British experts on two different occasions and by three American experts who also read the films twice. The investigators report a number of interesting differences, both inter-reader and intra-individual. They conclude, on the basis of these data, that "observer error" in the interpretation of x-rays is a "significant problem."

In presenting these data to the sophomore biostatistics class, it seemed to me that it was possible to extract more information of interest by a further analysis involving techniques not used by the original investigators. Furthermore, to state that "the amount of inter-individual and intra-individual disagreement was significant" perhaps leaves an area of ambiguity. It might contribute to our understanding of the data if we could specify certain differences which are *not* significant, in addition to those which are. And, in addition, it might be worth highlighting certain difficulties in assessing the statistical reliability of intra-individual differences.

TABLE I

Films Read TB Positive (TB+) and TB Negative (TB−) by British and American Readers (89 Films)

	1st Rdg.			2nd Rdg.		
Rdr	TB+	TB−		TB+	TB−	
British						
A	34	55		28	61	
B	24	65		29	60	
C	28	61		29	60	
D	27	62		29	60	
E	21	68		21	68	
F	23	66		24	65	
			X^2=5.78			X^2=3.07
			P > .05			P > .05
American						
J	35	54		31	58	
K	35	54		33	56	
L	28	61		30	59	
			X^2=1.58			X^2= .23
			P > .05			P > .05

Data on the reading of 89 chest x-ray films are re-analyzed. Six British and three American experts read the same films on two different occasions. Data indicate that in some instances there is agreement and in others significant disagreement.

Presented in Table I are the "TB positive" (TB+) and "TB negative" (TB−) readings for the 89 films for both British and American readers. These are adapted from the original tables. In the present form they are somewhat more wasteful of tabular space but have the merit of indicating precisely what comparisons are being made as well as specifying the statistical reliability of results of such comparisons. It is clear that differences among the British readers are *not* statistically reliable; that is, in both the first and second readings, the differences among the six British readers are of only chance magnitude. So, considering *only the number of films called TB+ and TB−*, these may not be characterized as "real" differences. And precisely the same thing may be said about differences among the American readers for both the first and second readings.

However, in striking contrast, when one considers only those films read as TB+ and breaks down these readings into "active" and "inactive" process, a different state of affairs obtains. As seen in Table II (also adapted from Garland and Cochrane), differences among the British readers are statistically significant for both the first and second readings—for the first readings at the one per cent level and for the second set of readings at the two per cent level. Not so, however, for the American readers. When one considers only the *number* of films read as "active" and "inactive," the English readers are different and the American readers are not.

Next, using the figures in Table I as a basis for comparing American with British readers, we can treat each of the figures as a "score" and apply the

TABLE II

Number of TB+ Films Read as Active and Inactive by British and American Readers

	British				
	1st Rdg.		2nd Rdg.		
	ACT.	INACT.	ACT.	INACT.	
A	11	23	12	16	
B	19	5	18	11	
C	17	11	17	12	
D	20	7	20	9	
E	5	16	5	16	
F	11	12	8	16	
		X^2=21.18			X^2=13.63
		P .01			P .02
	American				
J	20	15	17	14	
K	26	9	23	10	
L	18	10	20	10	
		X^2=2.40			X^2=1.68
		P > .05			P > .05

Wald-Wolfowitz runs test. (This is a "non-parametric" test and as such can be applied irrespective of the form which the distribution of scores takes.) In such a comparison we find, interestingly enough, that the British and American readers are *not* reliably different from each other on the first interpretation of the x-ray films, but are different on the second, using a five per cent level criterion of "real" difference.

Garland and Cochrane give percentage differences between pairs of readers and between two readings for the same reader. It is perhaps worth noting that the differences between *pairs* of readers should be regarded differently from those which obtain for single readers on two different occasions. In evaluating between-pair differences we are dealing with uncorrelated "scores," but the readings for the same individual on two different occasions are correlated. It is possible that a lower *absolute* difference could still be meaningful for intra-person differences of this sort.

Department of Psychiatry
University of Kansas Medical Center
39th and Rainbow
Kansas City 12, Kansas

References

1. Garland, L. H., and Cochrane, A. L.: Results of an international test in chest roentgenogram interpretation, J.A.M.A. 149:631, 1952.
2. Siegel, S.: Nonparametric Statistics, McGraw-Hill, 1956.

It is not enough for the United States to flood the world with dollars and technical know-how, essential to the world's health as these are. Some $60 billion and invaluable engineering knowledge and technical skills have been poured out in great and good works, and more must follow these. However, these are material and temporary. To consolidate for long-range development the vast investment in so-called foreign aid, management principles, techniques, attitudes, skills and climate must be made an indigenous part of a recipient country's way of life. At the point where enterprise is operated, where people are managed, where markets are analyzed and communities affected, the operators should be nationals, at least in their attitudes and sympathies. This puts a premium on education, training and the development of people to manage.

The shortage of technicians is acute; the shortage of trained managers is worse than acute. It is appalling. But it can be remedied through international cooperation in manager development. The genuine practitioner of management can be a bulwark of the free world against tyranny. The ability of a nation to defend itself, to maintain political, social and economic stability, and to achieve rising living standards depends largely upon the proper attitudes of the men and women who manage the nation's daily affairs. A necessary prerequisite to a nation's bright and free future, then, is an abundant supply of competent and dedicated managers.

But skill and knowledge are not enough. A competent manager's most essential qualities are integrity of character and a genuine feeling for the dignity, independence and freedom of his fellow man. People who do not have these spiritual and ethical qualities can use management's finest techniques to select, train and control others, whose productivity can be directed toward promoting a totalitarian ideology, Communist infiltration and aggression at the expense of human values.

Thus the international management movement, when based on sound human relations as well as on professional knowledge, can be one of the most powerful yet economical tools for maintaining and advancing mankind's interests, both material and moral.

—*A. M. Lederer*

The Artificial Kidney

Its Use in Management of Renal Failure and Poisonings with Consideration of Isolated Jejunal Segment Perfusion for Treatment of Chronic Uremia

WU-HAO TU, M.D., *and* PAUL R. SCHLOERB, M.D., *Kansas City*

Principles and technique of vividialysis with the artificial kidney are outlined and the use of the artificial kidney as an adjunct to management of acute renal failure, with two illustrative cases, is presented. Clinical experience with Kolff's twin-coil artificial kidney during the last two years at the University of Kansas Medical Center is summarized. Use of the artificial kidney in poisoning is described. The treatment of chronic renal failure with perfusion of an isolated jejunal segment at this institution is reviewed.

Introduction

Through development of homeostatic mechanisms to maintain constancy of the *milieu interieur*, the independence of higher animals from their environment was acquired. These homeostatic mechanisms are guarded by complex functions of the kidneys, lungs, gastrointestinal tract, and endocrine system. The kidneys are the most important end organs for regulation of body fluid composition upon which proper function of an organism depends. Corrective modification of body fluid has been made possible by development of a technique of vividialysis.

Artificial Kidney

The principle, purpose, and basic philosophy for use of an artificial kidney were well summarized by Abel, Rountree, and Turner[1] who applied the technique of dialysis to experimental animals in 1913 and stated, "There are numerous toxic states in which the eliminating organ of the body, more especially the kidneys, are incapable of removing from the body, at an adequate rate, natural or unnatural substances whose accumulation is detrimental to life. In the hope of providing a substitute in such emergencies, which might tide over a dangerous crisis, as well as for important information which . . . might thus be thrown on intermediary stages of metabolism, a method has been devised by which the blood of a living animal may be submitted to dialysis outside the body and again returned to the natural circulation without exposure to air, infection by microorganism, or any alteration which would necessarily be prejudicial to life; this process may be appropriately referred as vividiffusion."

Clinically available means of vividialysis, however, did not become available until Kolff[2] developed his artificial kidney, using cellophane as a dialyzing membrane and heparin as an anticoagulant. Since that time various types of artificial kidneys with different designs have been described, but in principle they are essentially the same. The artificial kidney thus developed maintains a dual function in that it not only removes substances, as was originally stated by Abel et al., but it also may add electrolytes which are essential to the body.

Principle of the Artificial Kidney: The principles of dialysis, osmosis, and ultrafiltration are shown diagrammatically in Figure 1. Commercially available cellophane is employed as a dialyzing membrane for the artificial kidney. Submicroscopic pores of the cellophane membrane when it is swollen with water allow passage of only small molecule substances such as water, electrolytes (sodium, potassium, magnesium, calcium, chloride, bicarbonate, etc.), crystalloids and drugs (barbiturates, salicylates, bromide, etc.). When two solutions are separated by this cellophane membrane, differential diffusion takes place according to the concentration gradient of each individual diffusible substance across the membrane (dialysis). Thus, by regulating the concentrations of specific constituents in a dialyzing solution, it is possible to add and withdraw various constituents of blood simultaneously. This makes the artificial kidney the most physiological means presently available for correcting

From the Departments of Medicine and Surgery, University of Kansas School of Medicine. Supported in part by Grant No. H-2363 from the National Institutes of Health, U. S. Public Health Service. Dr. Tu is a trainee in Arthritis and Metabolic Diseases, U. S. Public Health Service.

multiple electrolyte derangements and removing metabolic end-products at the same time.

Plasma protein, bacteria, and viruses are not permeable through the cellophane membrane because of their large molecular size relative to the pores of the membrane. The presence of protein in the blood, therefore, creates an osmotic pressure and the water moves across the cellophane membrane (osmosis) toward the blood. In an artificial kidney, in which a pressure gradient exists between the blood and the dialyzing solution, movement of water occurs across the cellophane membrane (ultrafiltration), a situation quite similar to ultrafiltration in human glomeruli. The pressure gradient can be provided from hydrostatic pressure by a pump to drive blood through the artificial kidney or by a combination of this positive pressure and negative suction applied to the dialyzing solution to maintain its circulation.

A schematic drawing of the Kolff twin-coil artificial kidney* is shown in Figure 2. Details of function of this artificial kidney have been described.[3, 4] Briefly this apparatus has a dialyzing area of 18,000 sq. cm. consisting of two parallel envelopes of cellophane tubing, 10 meters in length, each coiled around a can and separated by screens of polyvinyl chloride-coated Fiberglas. The patient's blood is forced through the cellophane coil under pressure provided by a Sigmamotor pump. The dialyzing solution is pumped from a 100-liter tank into the coil unit, flows through the fiber screen mesh, and overflows back into the tank. Removal of urea in terms of dialysance[5] (which actually equals the clearance when the dialyzing solution contains no urea) approximates twice that of normal human kidneys. By ultrafiltration, 300 to 400 ml. of water can be removed per hour of dialysis.

Technique of Vividialysis with the Artificial Kidney: The conventional artificial kidney is an apparatus through which the patient's blood flows continuously from his radial artery or inferior vena cava (through a greater saphenous vein) into a dialyzer unit and is then returned to the patient's circulation through a peripheral vein. Catheters are placed in an artery and a vein to obtain continuous flow of blood through the artificial kidney. These catheters are large enough to maintain blood flow of 200 to 300 ml. per minute. In practice, vividialysis is carried out for six hours with this flow rate. During this period dialyzing solution (bath fluid) is refreshed every two hours to increase the efficiency of the procedure.

Heparin, ordinarily in an amount of 120 to 150 mg. for six hours of dialysis for adults, is added to

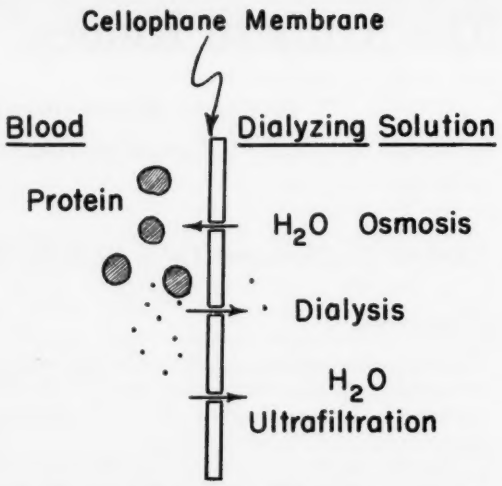


Figure 1. Principles of dialysis, osmosis, and ultrafiltration.

* Travenol Laboratories, Morton Grove, Illinois.

TABLE I
COMPOSITION OF BATH FLUID FOR THE ARTIFICIAL KIDNEY (TWIN-COIL)

Component	*Gm. per 100 L.*	*Milliequivalents per Liter* Na^+	K^+	Ca^{++}	Mg^{++}	Cl^-	HCO_3^-
Nacl	568	97	—	—	—	97	—
$NaHCO_3$	302	36	—	—	—	—	36
KCl	37.3	—	5	—	—	5	—
$CaCl_2 \cdot 2H_2O$	25	—	—	3.4	—	3.4	—
$MgCl_2 \cdot 6H_2O$	20.3	—	—	—	2	2	—
	Total	133	5	3.4	2	107.4	36
Total osmolarity						284.1	mOsm./L.
Glucose 0.2 per cent						10	mOsm./L.

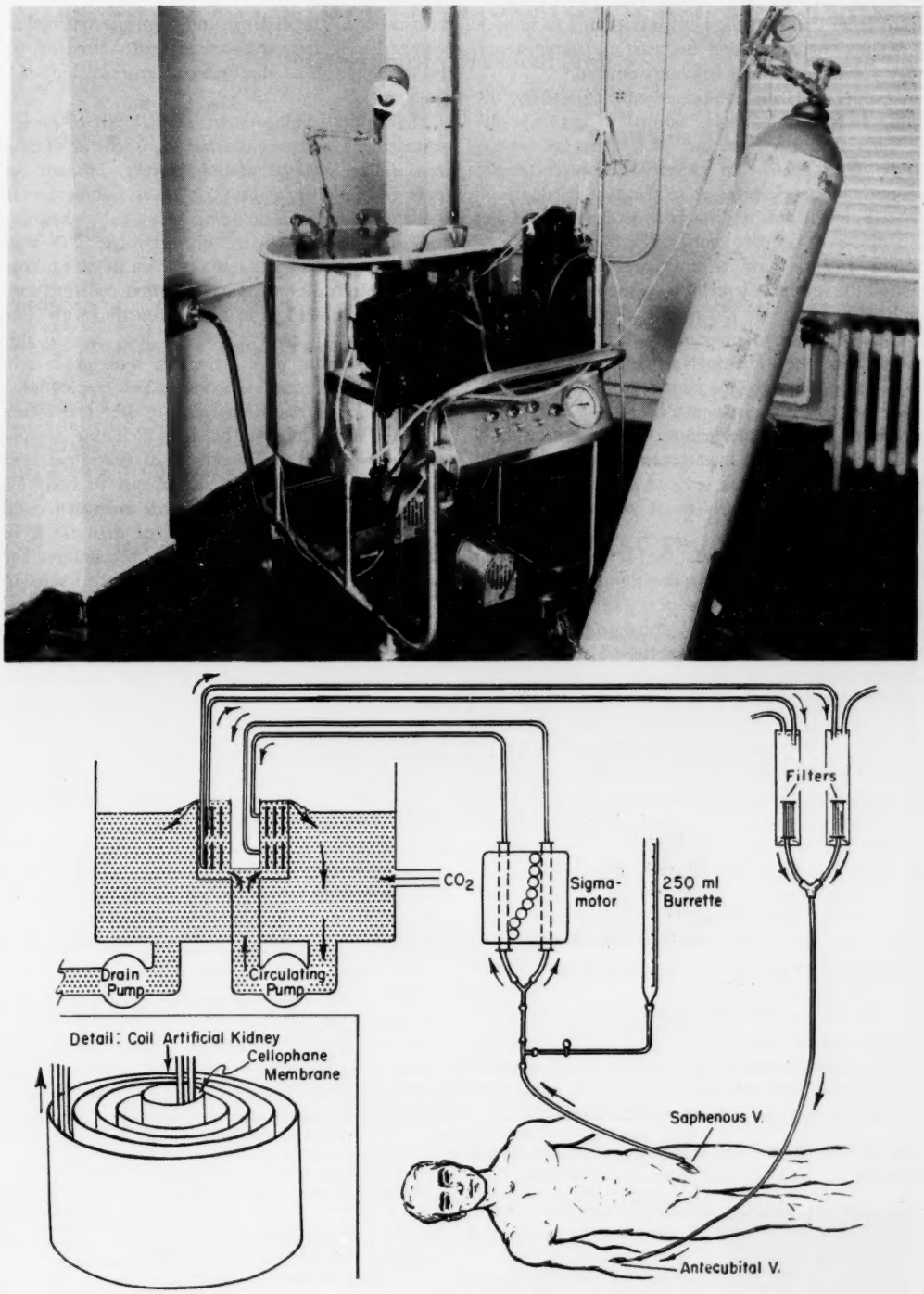


Figure 2. Kolff twin-coil artificial kidney.

this extracorporeal circulation to maintain fluidity of the blood in the system. In order to avoid possible hazard from this systemic heparinization, a technique of regional heparinization by titrating administered heparin with Protamine has been devised.[6]

A proper dialyzing solution should fulfill the following basic requirements: normal pH, (7.4); all the physiologically essential electrolytes of extracellular fluid present in appropriate concentration; appropriate osmotic pressure so that water balance of the patient will not be disturbed; temperature of the fluid of 38-39 degrees centigrade.

Since bacteria and viruses are not permeable through the cellophane membrane, the bath fluid does not have to be sterile but merely clean. Distilled or tap water is used to prepare the bath fluid.* Concentration of the individual electrolytes of the bath fluid is adjusted with due consideration for the electrolyte pattern of the patient's blood and his clinical picture. If, for example, removal of potassium is desired for treatment of hyperpotassemia, potassium in the dialyzing solution is reduced or may be omitted entirely. An example of the usual composition of bath fluid is given in Table I.

Time required for preparation for vividialysis with the artificial kidney varies depending upon the type of apparatus and availability of personnel. At least two to three hours are required. A radial artery or a greater saphenous vein and an antecubital or a cephalic vein for insertion of catheters are exposed by cutdown, and approximately an hour should be allowed for hemostasis of such incisions before heparin is administered at the beginning of dialysis. Three pints of blood less than 24 hours old are required to prime the artificial kidney. A patient who received many blood transfusions or who has had a blood transfusion reaction may require considerable time for typing and cross matching. Sometimes it may be difficult to obtain fresh blood on short notice. Therefore, a request to a blood bank should be given well in advance. The total time required for vividialysis is approximately eight to ten hours, including six hours run on the artificial kidney.

Optimally dialysis should be on an elective basis, and this can be done with the cooperation of the referring physician and close observation of the patient to anticipate the necessity for dialysis. Only rare patients, in fact, require emergency dialysis.

Use of the Artificial Kidney in Acute Renal Failure

Vividialysis with the artificial kidney is no longer an experimental procedure. In most large medical centers it is a standard hospital practice in the management of acute renal failure and some severe drug intoxications. The expense and cumbersome methods with earlier equipment have been partly obviated with the development of the twin-coil artificial kidney by Kolff et al.[3]

The artificial kidney is an integral part of medical management, and this over-all management of acute renal failure will be outlined briefly. Modern concepts of the management of renal failure are the result of better understanding of its pathophysiology and increased knowledge of electrolyte and water metabolism. Although causes of acute tubular necrosis are variable and numerous, its clinical course is fairly uniform—sudden loss of kidney function with severe oliguria which may last from a few days to three weeks and return of urinary flow with gradual improvement of renal function.[7] The principles of management of acute renal failure are: maintenance of water and electrolyte balance, including adequate supply of calories and avoidance of stress; extrarenal measures for correction of disturbance of body fluid composition, when indicated, such as with the artificial kidney or by other means of dialysis. A few aspects of the management that are encountered commonly and are important will be described briefly.

Importance of fluid restriction during the anuric-oliguric phase of acute renal failure has been emphasized. Endogenous water production, which is derived from release of preformed water when tissue is metabolized and water of oxidation of fat, glucose, and protein may amount to a significant quantity.* Daily requirement of water, therefore, to maintain water balance, a constant ratio of total body water to body solids, requires 550 ml. (or 330 ml. per square meter of body surface area) per day, assuming that an average insensible loss of water is approximately 1,000 ml.[9] Clinical estimation of occult overhydration is difficult. This has to depend largely on history. The referring physician should furnish as complete information as possible regarding previous administration of fluid and electrolytes.

With oliguria, starvation, and acidosis, increase of potassium over the total potassium capacity† will lead to an increased serum potassium concentration. Breakdown of tissue due to trauma, catabolism of tissue, and utilization of stored cellular glycogen will release potassium ion and decrease potassium capacity.

* If tap water contains significant amount of calcium or sodium a correction has to be made in preparing a bath solution for the presence of such electrolytes.

* 100 gm. of muscle tissue releases 75 gm. of preformed water and 10 gm. of water of oxidation and 8.5 gm. of urea. Breakdown of 100 gm. of fat tissue releases 35 gm. of preformed water and 72 gm. of water of oxidation.[8] Theoretically complete oxidation of 400 gm. of glucose administered to a patient will produce 234 gm. of water.

† Defined as: "the sum total of all anions and other chemical groups outside the extracellular space capable of binding or holding potassium ion."[10]

UNIVERSITY OF KANSAS SCHOOL OF MEDICINE

Postgraduate Medical Study

April, 1959

Symposium on

DRIVING ACCIDENTS:
Medical Factors

2:00 to 5:00 p.m., *April 8, 1959*

EYE DEFECTS AND VISION—Dr. Ralph W. Danielson, University of Colorado

NEUROLOGICAL DISEASES—Dr. Charles M. Poser, University of Kansas

HEARING DEFECTS—Dr. Russell E. Bridwell, University of Kansas

EMOTIONAL PROBLEMS—Dr. Donald L. Greaves, University of Kansas

MEDICAL DISORDERS—Dr. Maxwell G. Berry, University of Kansas

NO REGISTRATION OR ENROLLMENT FEE

ANESTHESIOLOGY

April 13, 14, 15, 1959

The twelfth annual Postgraduate Course in Anesthesiology concerns anesthesia outside the operating room and for mass casualties. More recent anesthetic drugs and the effects of new medications are discussed, with emphasis placed on physiology.

Besides the participation of eight leading anesthesiologists from this country, the faculty includes two outstanding representatives of the profession from Canada and England. All instructors participate in the discussion of problems of a rather controversial nature at the luncheon panels each day.

While primarily designed to answer the problems of the part-time anesthesiologist, the course is planned to be of sufficient interest to all in the specialty of anesthesiology.

FEE—$40.00

For program announcement and information, write:

DEPARTMENT OF POSTGRADUATE MEDICAL EDUCATION
University of Kansas School of Medicine
Kansas City 12, Kansas

---

facilities of the
Continuation Center and Student Union Building
For Reservations Write or Call....
Executive Director,
Continuation Center & Student Union Bldg.
University of Kansas Medical Center
39th & Rainbow
Kansas City, Kansas TA 2-5252 Extension 450
We invite you to make use of the facilities of the Continuation Center and Student Union Building (The Student Center) at any time you are in the Kansas City area—for professional training, for business, for pleasure. All-weather tunnels connect all buildings at the University of Kansas Medical Center.
• Studio-type guest rooms with twin beds, shower and tub are spacious and beautifully decorated.
• Air conditioning
• 24-hour desk service
• Free parking
• Telephone service
Rates: Single $5.50, Double $8.50

ACHROM
ACHROM
ACHROM
ACHROM
ACHROM
ACHROM

Tetracycline with Citric Acid *LEDERLE*

LEDERLE LABORATORIES, a Division of AMERICAN CYANAMID COMPANY, Pearl River, New York Lederle

IN ALCOHOLISM

A "SECOND BEST" ARMY FAILS TOTALLY

And against the main army of alcoholics—those whose drinking is a symptom of underlying pathology—less than a complete campaign is futile.

To shorten time, frustration and expense (simple efficient management) requires initial institutional care of these individuals:

1. To stop their ingestion of alcohol;
2. To detoxify the system;
3. To restore the fluid electrolyte balance;
4. To detect and correct nutritional anomalies peculiar to the individual alcoholic;
5. To overcome or reduce bodily ailments that contribute to the abnormal state and, finally
6. **To develop a program that will aid the particular individual in abstaining from all alcoholic beverages until death.**

The Ralph Clinic (in its 62nd year) is in the advance of every phase of the treatment of alcoholism. It invites consultation with you concerning your patients with problems of excessive drinking.

THE RALPH CLINIC

529 HIGHLAND AVENUE • KANSAS CITY 6, MISSOURI

Telephone VI. 2-3622

(A portfolio about the Problem of Alcoholism is available upon request).

A possibility of such endogenous potassium intoxication in crush injury was first suggested by Bywaters.[11] Elevation of serum potassium is reflected by characteristic electrocardiographic changes. This cardiotoxicity of potassium ion has immediate clinical significance since the progressive elevation of serum potassium eventually causes cardiac arrest. There is no direct correlation between serum potassium concentration and the electrocardiographic pattern, but a progressive change of potassium concentration parallels the electrocardiographic changes.[12] Therefore, serial tracings of the electrocardiograph offer the best information of the net effect of hyperkalemia and other concomitant acid-base disturbances. Where means for measurement of serum potassium are not readily available, serial electrocardiographic tracings are helpful.

In acute renal failure plasma CO_2-combining power or bicarbonate level correlates fairly well inversely with serum potassium concentration, and this should be measured in conjunction with the electrocardiographic tracing for evaluation of potassium intoxication. The earliest sign of hyperkalemia is an increase of amplitude and/or tenting of T waves.[13] Electrocardiographic changes of hyperkalemia may not be typical in the presence of acute cor pulmonale, pericarditis, hypertrophy of ventricle, block, or myocardial infarction.[13] Sinus arrest is an indication of advanced potassium intoxication and a warning sign that terminal electrocardiographic changes with disintegration of QRS complexes, sine waves, and cardiac arrest may occur within several hours. With the disappearance of P waves due to hyperkalemia, vividialysis should be planned without delay.

The approach to the treatment of hyperkalemia may be outlined as follows: increase of total potassium capacity with infusion of glucose and insulin and decrease negative nitrogen balance with testosterone;[14] use of antagonists to potassium ion, such as sodium and calcium; correction of acidosis with alkalinizing agents, i.e., sodium bicarbonate or lactate; extrarenal removal of potassium with cation exchange carboxylic resins through the gastrointestinal tract; and vividialysis. All of these measures except for dialysis will eventually fail in a closed system with anuria or severe oliguria. Vividialysis with the artificial kidney offers the most efficient means of correction and its effect may last for days.[15] Improvement of hyperkalemia following glucose-insulin-lactate infusion may be striking, but the duration of its effect is only five to six hours. This treatment should be carried on continuously lest rebound rise of serum potassium may occur. This is an effective way to tide over severe potassium intoxication until vividialysis becomes available.[15, 16]

The artificial kidney has an established place in the management of acute renal failure—one of the major medical emergencies. In acute tubular necrosis (lower nephron nephrosis), necrosis of renal tubules is a reversible process if sufficient time is given for regeneration. Life can be prolonged during this critical period with the use of the artificial kidney.[17, 18, 19, 20] Conventional methods of therapy are frequently insufficient to limit the rapid progression of uremia.[20, 21] In the Korean War, of 80 per cent who survived initial trauma and received medical care, 0.5 per cent developed posttraumatic renal insufficiency. With the establishment of a Renal Insufficiency Center and use of the artificial kidney, over-all survival rate was increased from 10 or 20 per cent to 47 per cent. Thus far, although experience is limited to the Korean War, potential value of the artificial kidney in military medicine is apparent.[22] With increased survival from initial trauma by improvement of medical care, more patients may later develop posttraumatic renal insufficiency.

Indications for Use of the Artificial Kidney: There are no rule-of-thumb indications for use of the artificial kidney. It is obvious that a prerequisite to consideration for its use is chemical derangement of blood, since what dialysis accomplishes is primarily a correction of blood chemistry alterations. Kolff's criteria[23] are: serum potassium of over 7.0, plasma bicarbonate of less than 12 mEq/L, and blood urea of 300 to 400 mg. per cent (BUN 140-190 mg. per cent). In general there is no close correlation between the symptomatology of uremia and blood concentrations. This is more apt to be true in chronic uremia than in acute uremia in which chemical disturbances of blood, more importantly the rate of deterioration, may be a good index of severity of uremia. In addition to blood chemical abnormalities, symptoms and signs of uremia must be taken into consideration such as clouding of sensorium or coma with inability to clear the air-way by coughing, intractable nausea and vomiting, signs of neuromuscular irritability, and dyspnea.

In emphasizing early timely use of the artificial kidney, dialysis is advocated on the fifth day of anuria-oliguria when clinical signs of uremia appear or, if those are absent, on the sixth day when anuria-oliguria continues.[24] Such rigid criteria may be debatable but are supported by the fact that when anuria-oliguria continues beyond the first week the majority of patients will become ill with clinical signs and symptoms of uremia and the time of death cannot be predicted.

Effect of Vividialysis: Abnormal pattern of the blood chemistry in uremia will be restored toward normal immediately following the dialysis. Metabolic acidosis will be corrected by increase of bicarbonate and increase of total base. Nitrogenous waste products

may be reduced to less than 50 per cent of the predialysis level.

Relief of symptoms and signs of uremia will be maximal 12 to 24 hours after the dialysis. Nausea and vomiting, dyspnea or tachypnea, and neuromuscular irritability are relieved. Improvement of mental status may be striking. Uremia-like symptoms due to severe infection or sepsis should be separated from those due to uremia,[25] and there is no reason to believe that the former will respond to vividialysis. If there is uremia and concomitant sepsis, removal of uremic retention products favorably influences the latter, however.

Clinical improvement following the dialysis may last for only two to three days or may last until recovery, although deterioration of the blood chemical pattern may continue further.

Clinical Experience at the University of Kansas Medical Center: Since a Kolff twin-coil artificial kidney became available at the University of Kansas Medical Center in January 1957, 11 vividialyses on eight patients with acute renal failure were performed by one of us (W. H. T.). The patients' ages ranged from 2 to 81 years. Three recovered. Of those who died, three showed acute tubular necrosis, one periarteritis nodosa, and one nephrosclerosis. Patients were hospitalized at the Medical Center or at the Kansas City Veterans Administration Hospital. They were referred for vividialysis, after which they were returned to their original services where further management was continued. Thus the sources and medical management for those eight patients are not necessarily uniform (Table II).

Four of the present series were treated with the artificial kidney within five days after onset of anuria or oliguria (in Case 4 the exact duration of anuria was not certain since the patient was comatose on admission and his history was not clear). All of those patients required emergency dialysis because of acute endogenous potassium intoxication. Case 2 sustained a cardiac arrest due to hyperkalemia and was restored to normal sinus rhythm by prompt cardiac massage and dialysis.[16]

Blood urea nitrogen concentrations in this group at the time of dialysis were 164, 191, 220, and 280 mg. per cent while plasma bicarbonate values were 6.8, 8.0, 7.0, and 6.8 mEq/L respectively. All except Case 5 had other disease. Case 5 recovered. It is apparent that patients in this group that required early dialysis had severe uremia with rapid progression.

TABLE II

PATIENTS WITH ACUTE RENAL FAILURE TREATED WITH THE ARTIFICIAL KIDNEY

Number of Patients	*Initials*	*Age*	*Sex*	*Duration of Oliguria*	**Oliguric Day of Vividialysis*	*Potassium Intoxication*	*Apparent Principal Cause of Acute Renal Failure*	*Secondary Factors and Associated Disease*	*Outcome*
1	EG	42	m	18	6 12 16	x	Transfusion reaction	Empyema of left chest	Died suddenly on 23rd day, in diuretic phase, of (?) heart failure
2	JL	29	m	5	3	x	Postoperative renal shutdown	Reticulum cell sarcoma of abdomen	Died suddenly of cardiac arrest, hyperkalemia
3	NG	63	f	14	9 13		Shock	Fracture of hip Cerebral edema	Died of intracranial hemorrhage
4	JS	81	m	5	3	x	? Bronchopneumonia Nephrosclerosis	Coma and shock	Never recovered after dialysis
5	LM	27	m	5	4	x	Severe vomiting		Recovered
6	EH	64	m	9	3	x	Periarteritis nodosa	Bronchopneumonia	Died of uremia
7	JH	2	m	10	9		Unknown		Recovered
8	SR	21	f	14	9	x	Postpartum renal shutdown		Recovered

* Oliguria: daily urinary output of less than 400 ml.

One patient would probably have been saved if dialyses were repeated earlier (Case 2). He died of the second cardiac arrest due to hyperkalemia while a second dialysis was being prepared.

Four patients, representing seven dialyses, were treated with the artificial kidney between the sixth and tenth day after onset of anuria, and they were still oliguric at that time. Two patients who were not dialyzed until the ninth day of oliguria recovered. They were free of associated disease or complication. Two patients who died had more than one dialysis (three dialyses in Case 1 and two dialyses in Case 3). Case 1, who suddenly collapsed and died on the 23rd day after the onset of anuria, when his daily urinary output was 2,300 ml., probably died of cardiac failure. Autopsy did not reveal the cause of his sudden death. Case 3 died of cerebral hemorrhage which probably had been aggravated by heparinization and hypertension incident to vividialysis.

Illustrative Case Reports

The following two patients are described in detail because they represent common problems which are encountered in practice and reflect the possible benefits from vividialysis.

Case 7 (58-9902). A 2-year-old boy was admitted to the University of Kansas Medical Center on July 15, 1958 because of oliguria of five days' duration. The child was apparently well until two weeks prior to admission when he had a cold with severe cough. Six days prior to admission the mother noted a rash in the child's mouth, and he had exacerbation of the cough. He received a penicillin injection. The following evening he started vomiting all foods and fluids except water. The next day he received another dose of penicillin. Vomiting continued and the child was not urinating, so he was admitted to a hospital. The vomiting and anuria persisted and he was transferred to this hospital.

The child was born by breech delivery and the neonatal course was without incident. He gained weight well and began taking solids at six weeks. He had many colds during the first year. Development had been normal. He was immunized with DPT and received polio immunization three times. He had never had serious illness. The mother was told that the child had albumin in his urine when he was seven months of age. There were no other siblings and the parents were healthy. The child received castoria or castor oil frequently for constipation.

On admission to the Medical Center, the child appeared well nourished and well developed, pale, irritable, and acutely ill. His weight was 26 pounds. The face appeared slightly puffy, and there was slight periorbital edema. No rales, but coarse rhonchi were heard throughout the lung fields. Heart and abdomen were negative. There was one plus puffiness in the extremities but no pitting edema. Neurological examination was negative.

Urinalysis revealed alkaline urine with trace of albumin, trace of sugar, some bacteria, and occasional pus cells per high power field. Urinalyses were obtained daily throughout the hospital course. Specific gravity ranged from 1.005 to 1.012; albumin was two plus on one sample, but the remainder showed only a trace of albumin; sugar was predominantly negative. Microscopic examinations showed many casts, both white cell and hyaline and there were a few white cells in each specimen. At no time were red cells observed.

Blood count on admission was: white cells 8,150 with 67 per cent polymorphonuclears, 27 per cent lymphocytes, and three per cent monocytes. Hemoglobin was 11.3 gm. per cent and hematocrit was 34 per cent. BUN was 90 mg. per cent, bicarbonate 14 mEq/L. On July 17, 1958 serum total protein was 4.0, with albumin 2.62 and globulin 1.38 gm. per cent. Nose culture on July 16, 1958 grew hemolytic Staphylococcus aureus, coagulase positive, and H. influenza. Throat culture revealed scant growth of H. influenza. Chest x-ray was normal. Antistreptolysin O titer was 50 on July 17, 1958.

The patient remained afebrile throughout the hospital stay. On July 18, 1958, the eighth day of oliguria, he appeared slightly confused. At this time serum sodium was 115 mEq/L, bicarbonate was 12.4 mEq/L, and the BUN was 120 mg. per cent. He was still oliguric and was treated with vividialysis on the ninth oliguric day. Dialysis was performed with one cellophane coil of the twin-coil artificial kidney for four hours. Blood was drawn from the inferior vena cava through the left greater saphenous vein to the dialyzer and was returned to the left antecubital vein. The child was lightly sedated with intravenous secobarbital during the procedure. He was awake during the latter part of the dialysis and was cooperative. The total heparin administered was 40 mg., and there was no hemorrhage at the cutdown sites. Coagulation time with modified Lee-White method was measured at intervals and was maintained at less than 17 minutes. The hemoglobin was maintained at 13.7 gm. per cent and hematocrit at 40 per cent (MCHC 34.2) by repeated measurement of hemoglobin and hematocrit and maintenance of fluid balance. The blood pressure was normal throughout. Plasma concentrations at the end of the dialysis were sodium 134, potassium 4.4, calcium 6.0, chloride 92, inorganic phosphorus 2.2, and bicarbonate 18.2 mEq/L. The BUN was reduced to 33.4 mg. per cent (Figure 3.)

Following the dialysis the child appeared more alert; appetite seemed to be increased and there was

no vomiting. Thirty-six hours after the dialysis he passed 795 ml. of urine over 24 hours, and from then on daily urinary output increased steadily. In spite of the onset of diuresis his blood urea nitrogen continued to rise again and reached a peak of 107 mg. per cent on the 13th day and then steadily decreased and reached a normal value on the 20th day. Clinically, after the dialysis, he did well and was discharged on July 30, 1958.

The cause of oliguria in this child is not known. It is not likely that he had an acute glomerulonephritis since there were no red cells nor significant casts in the urine. There was no history of ingestion or exposure to any known nephrotoxic agents. Dehydration and loss of electrolytes due to vomiting might have been the cause, but the history did not support this etiology. Whether penicillin had anything to do with the oliguria, such as a sensitivity phenomenon, is only a matter of speculation. Also it is not certain that he had an acute exacerbation of chronic glomerulonephritis.

Robinson's review[26] of the literature revealed that the incidence of acute anuria due to acute tubular necrosis of unknown cause is high in the pediatric age group. In view of the further progression of azotemia following the dialysis despite good diuresis, the uremia would have been more severe and management would have been more difficult if the progress of uremia was not halted on the ninth day with the vividialysis. Dialysis may not have been essential to this child's survival, but it was a useful adjunct in management.

This experience confirms the fact that the artificial kidney can be used safely in small children. [27, 28]

Case 8 (58-17006) (Figure 4). A 21-year-old gravida 2, para 2, white housewife was transferred to the Medical Center from another hospital on December 8, 1958, five days after onset of anuria. Five days prior to admission, when she was eight months pregnant, she had vaginal bleeding. Four hours later she delivered a stillborn fetus at the previous hospital. There was no history of excessive blood loss or episodes of hypotension or blood transfusion at labor. Following the labor she was given fluid by hypodermoclysis. She noted that she did not pass urine after the delivery. She did have back pain on the following day, but it was improving by the time of transfer to our hospital.

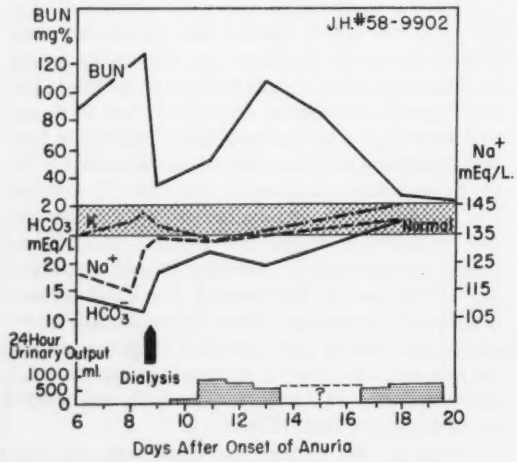


Figure 3. Clinical course of Case 7, J. H. (58-9902).

She gained 12 pounds during the pregnancy and noted puffiness of her own face during the last two or three months. There was no albumin or sugar in the urine or history of hypertension. There was no history of renal disease or any complication during her previous pregnancies. She took iron and calcium pills which were prescribed by her physician.

Examination revealed a well developed and nourished obese white woman who appeared chronically ill and alert. She had hacking cough. Temperature was normal, blood pressure was 130/85, and the pulse was 90. Fundi oculi were normal. There were inspiratory squeaks in the upper one-third of the lung fields, but no moist rales. There was a grade 2 systolic murmur over the apex and left sternal border. Pulmonic second sounds were louder than the second aortic sound. No friction rubs were heard.

Abdominal examination revealed tenderness in both flanks and the right kidney was thought to be palpable, but subsequent examination could not confirm this finding. The liver was felt 2 cm. below the right costal margin. There was two plus edema of the lower extremities. Skin was dry and pale. Babinski's sign was absent and deep reflexes were normal.

Urinalysis revealed acid reaction, specific gravity 1.005, albumin one plus, and negative sugar. There were 6 or 8 pus cells per high power field. White cell count was 11,300 with 81 per cent polymorphonuclear, 15 per cent lymphocytes, and 4 per cent monocytes. Hemoglobin was 4.8 gm. per cent and reticulocytes were 10.2 per cent. Serum iron was 165 gamma per cent. Total serum bilirubin was 0.73 and direct bilirubin was 0.22 mg. per cent. Total serum cholesterol was 250 mg. per cent with 61 per cent esters. Serum albumin was 2.93 and globulin was 1.95 gm. per cent. Direct and indirect Coombs tests were negative.

Bone marrow biopsy revealed hypercellular marrow. BUN was 175, creatinine 14 mg. per cent. Serum sodium was 132, potassium 6.2, chloride 91, and plasma bicarbonate 10.5 mEq/L. An electrocardiogram revealed tenting of T waves, and a chest x-ray film was normal. Urine culture on December 14, 1958 revealed heavy growth of Enterococci and a few E. coli.

The patient was placed on 160 gm. carbohydrate,

20 gm. protein diet, and fluid intake was restricted to allow daily weight loss. On this regimen she lost 5 pounds in 24 hours. From the time of admission vomiting and nausea persisted. Daily urinary output ranged from none to less than 300 ml. She had epistaxes occasionally but not of serious degree, and these were controlled with an anterior nasal pack. She remained mentally clear and cooperative.

On the morning of the ninth day after the onset of oliguria the patient was noted to be "jittery" with tachypnea of 30 to 40. There were fine muscular twitchings of the upper extremities whenever she moved. Babinski's sign was positive bilaterally and quadriceps reflexes were hyperactive. These signs of neuromuscular irritability were not present on the previous day. An electrocardiogram at this time revealed a widening of QRS complexes and increased amplitude of tented T waves for the first time. Blood concentrations at this time were as shown in Table III, before dialysis. Because of her severe azotemia, signs of increased neuromuscular irritability, nausea and vomiting and further deterioration shown on her electrocardiogram, vividialysis was performed in the afternoon.

The dialysis was performed for six hours with 110 mg. of heparin which was administered only at the beginning of the procedure. There was some oozing of less than 200 ml. of blood from the cut-down. During the later course of the dialysis she started to have nasal bleeding, and this was controlled with an anterior nasal pack. The blood pressure was stable throughout the procedure. Effect of vividialysis is shown in Table III. Total urea nitrogen removed by this dialysis was 85 gm. (urea 182 gm.). Hematocrit was increased from 10 per cent to 21.8 per cent and the hemoglobin from 5.6 to 9.9 gm. per cent.

She appeared improved clinically on the following day. However, nausea and vomiting did not improve until 24 hours later, when she complained that she was hungry. Subsequently she continued to feel fine and ate well. She became markedly anemic with a hemoglobin of 5 to 6 gm. per cent, in spite of blood transfusions. There was no excessive external blood loss except for vaginal spotting which was not more than that usually seen postpartum. A dilatation and curettage was done on January 1, 1959. She was discharged on the 35th day after the onset of oliguria to be followed as an outpatient.

This patient represents a not uncommon problem —a postpartum renal shutdown. The cause of her renal failure is not known. Vividialysis was not performed until the ninth day of oliguria when signs and symptoms of advanced uremia appeared. By this time she had all the indications for dialysis; BUN was 292 mg. per cent (urea 624 mg. per cent), serum potassium was 7.9, bicarbonate was 9.9 mEq/L, and uremic symptoms were present. A small urinary output, up to 300 ml. by this time, was neither sufficient to relieve uremia nor evidence for the onset of diuresis. Probably this patient would have been in more serious trouble with convulsions or potassium intoxication if her uremia had been allowed to progress beyond this time. Single dialysis was effective in preventing further deterioration. The remainder of her course was uneventful although an abnormal blood chemistry pattern developed after diuresis (Figure 4.)

The indication for the use of the artificial kidney in acute potassium intoxication is so clear-cut that none will demur its use. The two cases were presented to emphasize that, aside from treatment of potassium intoxication, a protracted course of anuria-oliguria following acute renal failure can be made benign, possibly preventing common complications, with the timely incorporation of the artificial kidney into the scheme of conservative management. According to the criteria of indication by others, our dialyses were late in the course of oliguria and their indications were based upon the over-all clinical picture. A decision to employ the artificial kidney and when, as well as the possible benefit from such procedure, should be considered in conjunction with the man-

TABLE III

RESULTS OF VIVIDIALYSIS WITH THE ARTIFICIAL KIDNEY, S.R. CASE 8 (58-17006)

	Before Vividialysis	*After Vividialysis*
BUN	292 mg %	107 mg %
Creatinine	23 mg %	9.5 mg %
Uric acid	25 mg %	9.2 mg %
Na	138 mEq/L	141 mEq/L
K	7.9 mEq/L	6.1 mEq/L
Ca	3.5 mEq/L	5.2 mEq/L
HCO_3	9.9 mEq/L	21.8 mEq/L
HPO_4	8 mEq/L	4.1 mEq/L
Cl	89 mEq/L	97 mEq/L

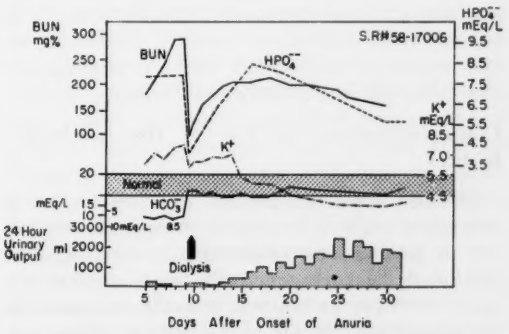


Figure 4. Clinical course of Case 8, S. R. (58-17006).

agement of each patient. Progress of uremia, secondary factors such as infection or shock or associated or underlying disease, should be carefully evaluated. Use of the artificial kidney should not be postponed as a last resort.

Treatment of Acute Poisoning, not Primary Nephrotoxin, with the Artificial Kidney

The artificial kidney is an efficient means of treatment of poisoning with some drugs. A comprehensive review of this subject was published recently.[29] Dialysis is useful in poisoning with drugs that have a low molecular weight; are permeable through the cellophane membrane; exist in plasma in the free state or are only loosely bound with plasma protein; are freely diffusable between the extracellular fluid compartment and other body fluid compartments, or which reach chemical equilibrium quickly. The artificial kidney has been reported to be effective in treating poisoning due to phenobarbital,[30, 31, 32] amobarbital,[30, 32] secobarbital,[32] pentobarbital,[32] acetylsalicylate,[1, 33, 34] methylsalicylate (wintergreen oil),[29] bromide,[29, 35, 36, 37] potassium thiocyanate,[38] diphenylhydantoin (Dilantin),[29, 39] strontium and radiocalcium,[40] tritium,[41] glutethimid (Doriden),[42] and ammonia.[43]

Some of the commonly used drugs should be removable with the artificial kidney but have not yet been reported. These are: barbituric acid (Mysoline, Metharbital); mesantoin and phenacemids; chloral hydrate; methonium compounds, particularly with uremia induced by the use of these compounds in hypertensive patients.

Lowering of the temperature of the extracorporeal circulation system may be useful in severe pyrexia (i.e., salicylate poisoning) and oxygenation of 200 to 300 ml. of blood per minute may be a significant contribution in severe hypoxemia. The most ideal indication for vividialysis in barbiturate poisoning is that with phenobarbital or amobarbital.[32] Removal of salicylate by the artificial kidney is 20 times or more faster than normal kidneys functioning under optimal conditions.[29] Vividialysis is the most effective way of treating severe bromide intoxication. Unlike human kidneys, the artificial kidney does not selectively reabsorb bromide in preference to chloride.

Contraindication for Use of the Artificial Kidney

Necessity for anticoagulation with heparin during vividialysis tends to preclude use of the artificial kidney in patients with hemorrhage or its possibility, particularly hemorrhage into the central nervous system.[44, 45, 46] Hemorrhage was generally regarded as an unfavorable sign for use of the artificial kidney, particularly bleeding from the gastrointestinal tract.[2, 46] However, recent experiences of others[19, 20] and our own seem to indicate that this general view may need some revision. Among a series of our cases, hemorrhage due to hemostatic defect(s) associated with uremia was improved following dialysis. An emergency vividialysis was performed by the author for 4 hours and 20 minutes immediately following a thoracotomy and cardiac massage for cardiac arrest due to acute potassium intoxication.[16] A technique of regional heparinization[6] may reduce hazard of hemorrhage caused by heparin.

Thus a general view that hemorrhage in uremic patients is a contraindication for use of the artificial kidney should be evaluated in each individual case. It appears that there may be a hemostatic defect associated with uremia that may respond favorably to vividialysis rather than be a contraindication to such a procedure.

Vividialysis in Management of Chronic Renal Failure

Indication for dialysis with the artificial kidney in chronic renal failure is prospective relief of symptoms. With the best medical management currently available, slowly progressing chronic renal failure may reach a point where symptoms and signs of uremia may become refractory to treatment. Nausea, vomiting, and anorexia may lead to electrolyte and water imbalance and caloric intake may become unsatisfactory. Under such circumstances renal function may deteriorate further, and thus a vicious cycle sets in. Vividialysis may break this cycle by relieving symptoms and signs and by correcting acid-base imbalance. The patient may be restored to a state of satisfactory equilibrium and may be able to continue to live a comfortable and useful life within the narrow range of his renal function.

Management of acute exacerbations of chronic uremia due to stress, such as infection or surgery, may be effectively supported by vividialysis. Long-lasting clinical improvement, in spite of return of blood chemical abnormalities, is an occasional effect of dialysis in chronic renal failure.[47, 48] Unfortunately this clinical improvement following treatment with the artificial kidney is unpredictable. While patients with vascular diseases or severe hypertension or with poor urinary output are poor candidates for dialysis, occasional good results seem to warrant continued trials.

Referring the Patient for Dialysis

From the foregoing it is apparent that the artificial kidney can be one of the most useful means of management of acute renal failure by substituting for renal excretory function and by correcting acid-base imbalance. Although the clinical course of acute tubular necrosis is uniform, the onset of diuresis or sudden death is unpredictable, not only during the anuric-

oliguric phase but also during the diuretic phase. Consideration of vividialysis with the artificial kidney should be included in the over-all plan of management of every patient with acute renal failure. This by no means implies that all patients should be treated with the artificial kidney.

Regarding "conservative management versus use of the artificial kidney," it cannot be made more clear than the statement by Merrill,[46] "A fundamental misconception seems to be at fault; that there should be a choice between conservative measures and the use of the artificial kidney. Dialysis in the treatment of acute renal failure must be thought of as an adjunct to, rather than a substitute for, good conservative measures of management."

When the diagnosis is apparent, a center where an artificial kidney is in operation should be notified and personnel involved in the operation of the artificial kidney kept informed of the situation and further progress. Direct transmission of serial electrocardiograms by conventional telephone[49] will provide a convenient means of evaluation of potassium intoxication. After a period of initial observation and treatment for a few days, if it appears that progression of uremia is rather rapid, i.e., rise of serum potassium over 1.0 mEq/L or blood urea nitrogen over 30 mg. per cent over a 24-hour period, a tentative agreement as to circumstances under which arrangements will be initiated for dialysis or transfer of the patient for a final evaluation for dialysis may be made.

A small increment of urine output, i.e., 100-200 ml. over 24 hours in oliguric patients, does not necessarily herald an onset of diuresis. Even with a daily urinary output of 400-600 ml. the uremic syndrome may continue to progress. Increased urinary output may be a happy sign that diuresis is starting, but careful management must be continued since about 25 per cent of fatalities occur during the diuretic phase.[21] Patients with advanced potassium intoxication should be started on intravenous infusion of glucose-insulin and sodium bicarbonate or lactate solution, if this therapy is not contraindicated by pulmonary edema or hypertension, and this should be continued during his trip to the hospital. Such a patient may have to be accompanied by a physician and equipment for resuscitation. An artificial kidney map can be found in a recent publication which indicates the locations of artificial kidneys available in civilian hospitals throughout the United States.[50]

Other Methods of Dialysis in Management of Renal Failure

Peritoneal Dialysis: A method for peritoneal dialysis based upon a modification of one proposed by Grollman[51] has been described by one of us.[52]

Peritoneal dialysis may have occasional application in the adjunctive management of acute renal failure, chiefly for the correction of hyperpotassemia, with some correction of acidosis, water removal, and reduction in azotemia as well. Except for the concurrence of bleeding which would contraindicate necessary heparinization for hemodialysis, its use in preference to extracorporeal vividialysis can hardly be justified when a dialyzing apparatus and team are available, since possible complications of peritoneal dialysis are greater and efficiency is reduced.

Intestinal Perfusion: Intestinal perfusion has been employed to remove uremic metabolites and to maintain water and electrolyte homeostasis, as reviewed by Twiss[53] and more recently by Merrill.[46] Behavior of the intestinal mucosa as an active rather than a passive semipermeable membrane with regard to electrolytes has engendered some difficulty in the composition of perfusate solutions, but it has been shown that physiologic conditions for desired water and electrolyte transfers exist,[54] while sufficient nitrogen, chiefly as urea, may be removed in uremia to maintain over-all nitrogen balance with moderate azotemia. It is also well established that phosphate, uric acid, creatinine, and probably other larger molecule uremic metabolites are not removed in sufficient quantities to lower plasma concentrations significantly.

In acute renal failure, intestinal perfusion may be used to combat hyperpotassemia by removal of potassium and chloride and by producing some sodium absorption, together with removal of urea but not significant amounts of other uremic metabolites. Practical considerations such as nausea and vomiting limit its application, and gastrointestinal surgery, ileus, or any condition predisposing to gastrointestinal hemorrhage contraindicates its use.

While peritoneal dialysis or intestinal perfusion may have occasional application in acute renal failure where an artificial kidney and a dialyzing team are not available or are not feasible to employ, because the disease has progressed unduly or because transportation facilities are inappropriate, their use in preference to vividialysis with the artificial kidney on an elective basis can hardly be justified.

Isolated Jejunal Segment Perfusion in Chronic Uremia: With the best fluid-electrolyte and dietary management available today, some patients with chronic uremia will continue to progress and die of their disease. This may be considered to represent progressive decompensation of renal function, and any treatment measure which would afford even a small increment of benefit in removing uremic metabolites and in restoring water and electrolyte homeostasis should have a salutary effect on the clinical course.

For the past two years one of us (P. R. S.) has studied the clinical application of perfusion of an operatively isolated jejunal segment, comprising the proximal half of the small intestine.[55] This experience now consists of four patients, two of whom suc-

cumbed in uremia without more than slight and temporary benefit. The course of one of the two patients was complicated by the combination of overwhelming sepsis and uremia. The second patient, following an uncomplicated operative procedure, was observed to have only minimal exchange of water, electrolytes, and crystalloids across the intestinal mucosa during the isolated intestinal segment perfusions. This decreased exchange may have been related to marked arteriolosclerosis in the submucosal vessels, as demonstrated at autopsy.

One of these patients has been presented in detail elsewhere.[55] In this patient with progressive oliguria, maintenance of water and electrolyte homeostasis was feasible by appropriate adjustments of the perfusate composition. Application of this information permitted subsequent management for one month at home where 24 additional perfusions were done until anuria and fatal uric acid intoxication occurred.

Another patient, a 26-year-old girl with polycystic kidney disease, has also been reported previously.[52] This patient in whom an isolated jejunal segment procedure was performed 21 months ago, has had a gratifying course and perfuses her isolated jejunal segment once weekly at home. She continues to work full time as a secretary. An exacerbation of uremia due to pyelonephritis occurred six months ago and was accompanied by an elevation of the BUN to 170 mg. per cent with typical uremic symptoms and acidosis corresponding to uremia of this degree. By a combination of perfusion of the isolated jejunal segment and appropriate fluid-electrolyte and dietary management, the uremia regressed and she was discharged with a blood urea nitrogen of 40 mg. per cent. She is asymptomatic at present.

While it has no application to the management of acute renal failure, perfusion of an isolated intestinal segment appears to be the only method presently available for adjunctive management of progressive chronic uremia over a long period of time by the patient. Total renal function is not attained because of failure to remove adequate amounts of phosphate, creatinine, uric acid, and probably other larger uremic metabolites. It will otherwise defend the composition of the extracellular fluid and, indirectly, intracellular constituents, as well as body water, and will remove sufficient urea to maintain an acceptable nitrogen economy. The use of commonly available salts, sugar, and tap water, together with non-sterile perfusion carboys and tubing, makes it an inexpensive procedure. Discomfort related either to the presence of the isolated segment or to the perfusions has not been observed.

It is believed from our experiences thus far that this may be of benefit to young individuals with progressive renal disease. Polycystic kidney disease would appear to be an ideal condition to which isolated jejunal segment perfusion might be applied when renal decompensation and hypertension become evident on good management and before severe uremia has developed.

Acknowledgment

The support and encouragement of Dr. Robert E. Bolinger, associate professor of medicine, is gratefully acknowledged. Appreciation is expressed to Dr. E. Grey Dimond, Department of Medicine, and Dr. Daniel C. Darrow, Department of Pediatrics, for their cooperation and permission to include their patients in these case presentations.

University of Kansas Medical Center
39th and Rainbow
Kansas City 12, Kansas

Bibliography

1. Abel, J. J.; Rountree, L. G., and Turner, B. B.: On the removal of diffusible substances from the circulating blood by means of dialysis, Trans. Assoc. Am. Phys. 28:51, 1913.

2. Kolff, W. J.: New Ways of Treating Uremia, J. and A. Churchill Ltd., London, 1947.

3. Kolff, W. J., and Watschinger, B.: Further development of a coil kidney, J. Lab. & Clin. Med. 47:969, 1956.

4. Meyer, R.; Straffon, R. A.; Rees, S. B.; Guild, W. R., and Merrill, J. P.: A laboratory and clinical evaluation of the Kolff coil kidney, J. Lab. & Clin. Med. 51:715,1958.

5. Wolf, A. V.; Remp, E. C.; Kiley, J. F., and Currie, G. D.: Artificial kidney function. Kinetics of hemodialysis, J. Clin. Invest. 30:1062, 1951.

6. Gordon, L. A.; Simon, E. R.; Rukes, J. M.; Richards, V., and Perkins, H. A.: Studies in regional heparinization. II. Artificial kidney hemodialysis without systemic heparinization—Preliminary report of a method using simultaneous infusion of heparin and protamine, New Eng. J. Med. 255:1063,1956.

7. Bull, G. M.; Joekes, A. M., and Lowe, K. G.: Renal function studies in acute tubular necrosis: Clin. Science 9:379, 1950.

8. Hamburger, J., and Mathé, G.: Fluid Balance in Anuria, The Kidney, Ciba Foundation Symposium, Little, Brown and Company, Boston, 1954.

9. Bluemle, L. W., Jr.; Potter, H. P., and Elkinton, J. R.: Changes in body composition in acute renal failure, J. Clin. Invest. 35:1094, 1956.

10. Scribner, B. H., and Burnell, J. M.: Interpretation of the serum potassium concentration, Metabolism 5:468, 1956.

11. Bywaters, E. G. L., and Beall, E.: Crush injuries with impairment of renal function, Brit. M. J. 1:427, 1941.

12. Winkler, A.; Hoff, H. E., and Smith, P. K.: Electrocardiographic changes and concentration of potassium in serum following intravenous injection of potassium chloride, Am. J. Physiol. 124:478, 1938.

13. Levine, H. D.; Vasifder, J. P.; Lown, B., and Merrill, J. P.: "Tent-shaped" T waves of normal amplitude in potassium intoxication, Am. Heart J. 43:437, 1952.

14. Schloerb, P. R.: Unpublished data.

15. Merrill, J. P.; Levine, H. D.; Somerville, W., and Smith, S., III: Clinical recognition and treatment of acute potassium intoxication, Ann. Int. Med. 33:797, 1950.

16. Tu, W. H., and Crockett, J. E.: Treatment of cardiac arrest due to acute potassium intoxication. Restoration of normal sinus rhythm after treatment with artificial kidney, J.A.M.A. 165:1253, 1957.

17. Vanata, J. V.; Muirhead, E. E., and Grollman, A.: Improvement on the artificial kidney; an experimental study of its application to dogs bilaterally nephrectomized or otherwise deprived of renal function, Am. J. Physiol. 156:443, 1949.

18. Leonards, J. R., and Heisler, C. R.: Artificial kidney. IV. Maintenance of life in bilaterally nephrectomized dogs and its relation to malignant hypertension, Am. J. Physiol. 167:553, 1951.

19. Aoyama, S., and Kolff, W. J.: Treatment of renal failure with the disposable artificial kidney. Results in fifty-two patients, Am. J. Med. 23:565, 1957.

20. Smith, L. H., Jr.; Post, R. S.; Teschan, P. E.; Amernathy, R. S.; Davis, J. H.; Gray, D. M.; Howard, J. M.; Johnson, K. E.; Klopp, E.; Mundy, R. L.; O'Meara, M. P., and Rush, B. F.: Post-traumatic renal insufficiency in military casualties. II. Management, use of an artificial kidney, prognosis, Am. J. Med. 18:187, 1955.

21. Swan, R., and Merrill, J. P.: The clinical course of acute renal failure, Medicine, 32:215, 1953.

22. Teschan, P. E., and Baxter, C. R.: The future of hemodialysis in military medicine, J.A.M.A. 166:11, 1958.

23. Kolff, W. J.: Acute renal failure; causes and treatment, Med. Clin. of North Amer. 39:1041, 1955.

24. Salisbury, P. F.: Timely versus delayed use of the artificial kidney, A.M.A. Arch. Int. Med. 101:690, 1958.

25. Meroney, W. H.: Uremia-like symptoms not due to uremia in battle casualties, J.A.M.A. 158:1513, 1955.

26. Robinson, G. C., and Wong, L. C.: Acute tubular necrosis in infancy and childhood, A.M.A. J. Dis. Child. 95:417, 1958.

27. Carter, F. H., Jr.; Aoyama, S.; Mercer, R. D., and Kolff, W. J.: Hemodialysis in children, report of five cases, J. Pediat. 51:125, 1957.

28. Mateer, F. M.; Greenman, L., and Danowski, T. S.: Hemodialysis of the uremic child, A.M.A. J. Dis. Child. 89:645, 1955.

29. Schreiner, G. E.: The role of hemodialysis (artificial kidney) in acute poisoning, A.M.A. Arch. Int. Med. 102:896, 1958.

30. Kyle, L. H.; Jeghers, H.; Walsh, W. P.; Doolan, P. D.; Wishinsky, H., and Pallota, A.: The application of hemodialysis to the treatment of barbiturate poisoning, J. Clin. Invest. 32:364, 1953.

31. Alwall, N.; Lundgren, P., and Lundequist, P.: On the artificial kidney. XX. Treatment of severe phenobarbital poisoning in rabbit, by means of forced polyuria, exchange ultrafiltration and dialysis, and a preliminary report of dialytic treatment of barbiturate poisoning in patients, Acta Med. Scandinav. 143:299, 1952.

32. Sunshine, I., and Leonards, J. R.: Use of artificial kidney for removal of barbiturate in dogs, Proc. Soc. Exp. Biol. 86:638, 1954.

33. Doolan, P. D.; Walsh, W. P.; Kyle, L. H., and Wishinsky, H.: Acetylsalicylic acid intoxication: proposed method of treatment, J.A.M.A. 346:195, 1954.

34. Schreiner, G. E.; Berman, L. B.; Griffin, J., and Feys, J.: Specific therapy for salicylism, New Eng. J. Med. 253:215, 1955.

35. Merrill, J. P., and Weller, J. M.: Treatment of bromism with the artificial kidney, Ann. Int. Med. 37:186, 1952.

36. Schreiner, G. E., and Berman, L. B.: Dialysance of bromide from blood and spinal fluid, Clin. Res. Proc. 5:233, 1957.

37. Costa, J. S.; Meuno, R. P.; Schreiner, G. E., and Berman, L.: Some observations of a case of bromide intoxication undergoing hemodialysis, Am. J. Psychiat. 113:-1030, 1957.

38. Danzig, L. E., and Kugel, A. J.: Use of the artificial kidney in treatment of thiocyanate psychosis, J.A.M.A. 158:560, 1955.

39. Berman, L. B.; Jehers, H. J.; Schreiner, G. E., and Palotta, A.: Hemodialysis, an effective therapy for acute barbiturate poisoning, J.A.M.A. 161:820, 1956.

40. Looney, W. B.; Maletskos, C. J.; Helmick, M.; Reasdon, J.; Cohen, H., and Guild, W.: The artificial kidney and ion exchange resins as possible methods of removing radio elements from the body, Radiology 68:255, 1957.

41. Kiley, J. E.; Barenberg, R. L., and Cuklin, W. H.: Dialysance of tritium with the twin-coil artificial kidney, Clin. Res. Proc. 6:294, 1957.

42. Schreiner, G. E.; Berman, L. B.; Kovack, R., and Bloomer, H. A.: Acute gluthethimide (Doriden) poisoning; the use of Bemigride (Megimide) and hemodialysis, A.M.A. Arch. Int. Med. 101:899, 1950.

43. Kiley, J. E.; Joseph, C.; Pender, J. C.; Welch, H. F., and Welch, C. S.: Ammonia intoxication treated by hemodialysis, New Eng. J. Med. 259:1156, 1958.

44. Fishman, A. P.; Kroop, I. G.; Leiter, H. E., and Hyman, A.: Experiences with Kolff artificial kidney, Am. J. Med. 7:18, 1949.

45. Bywaters, E. G. L., and Joekes, A. M.: Artificial kidney: its clinical application in treatment of traumatic anuria, Proc. Roy. Soc. Med. 41:420, 1948.

46. Merrill, J. P.: The Treatment of Renal Failure, Grune & Stratton, New York, London, 1955.

47. Goldner, F.; Gordon, G. L., and Danzig, L. E.: Use of artificial kidney in chronic renal disease, A.M.A. Arch. Int. Med. 93:61, 1954.

48. Nakamoto, W., and Kolff, W. J.: Chronic uremia due to polycystic renal disease treated with the artificial kidney, A.M.A. Arch. Int. Med. 101:921, 1958.

49. Dimond, E. G.: Transistor for transmission of electrocardiograms by telephone, J.A.M.A. 167:1624, 1958.

50. Berman, L., and Rose, J. C.: The referring physician and the artificial kidney, G. P. 17:95, 1958.

51. Grollman, A.: Acute Renal Failure, Springfield, Charles C Thomas, 1954.

52. Schloerb, P. R.: Peritoneal dialysis and newer methods of intestinal perfusion in renal failure, A.M.A. Arch. Int. Med. 102:914, 1958.

53. Twiss, E. E.: Treatment of uremia by dialysis and other methods with special regard to the principles and scope of intestinal dialysis. Drukkerij M. Wyt and Zonen, Rotterdam, 1950, pp. 45-83.

54. Tu, W. H., and Kolff, W. J.: Treatment of uremia by lavage through intestinal loops in dogs, J. Appl. Physiol. 9:116, 1956.

55. Schloerb, P. R.: The management of uremia by perfusion of an isolated jejunal segment: with observations of the dynamics of water and electrolyte exchange in the human jejunum, J. Clin. Invest. 37:1818, 1958.

It is one of the marks of the cultured man that he presents a unity; he is not a humane man and a thinking man, but his humanity and his reason seem to be all of a piece, and so much of a piece that it seems important not to separate the one from the other—so that his humanity never overcomes his reason, nor does his reason ever replace his humanity, but both work in harmony and balance together.

—Ashley Montagu

PRESIDENT'S PAGE

DEAR DOCTOR:

The Kansas Medical Society has become one hundred years of age. I have selected the following five as the outstanding achievements in this period and cite them as the golden efforts from our past.

1. *The charter* on February 10, 1859, by the territorial legislature granted to the Kansas Medical Society "perpetual succession forever" toward the end that a better quality of medical care might be given to the people of this state.

2. *The Board of Medical Examiners* was created in 1879 to guarantee the public that in the future every licensed physician would have completed a minimum level of educational experience.

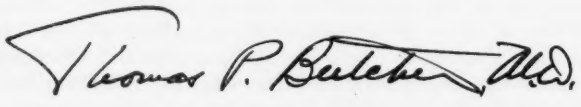
3. *The School of Medicine* established at the University of Kansas in 1879 to afford an opportunity for the young men and women of this state to prepare themselves for the practice of medicine.

4. *The Board of Health* was formed in 1885 recognizing a state responsibility over problems of sanitation and preventive medicine.

5. *Blue Cross and Blue Shield* were chartered in 1943 and 1945 to provide for the public the opportunity for protection against the cost of catastrophic illness.

As I look these over, I feel fortified by our accomplishments to challenge the critic to present any organization that has given more for the public benefit than has the Kansas Medical Society.

Very sincerely,



EDITORIAL COMMENT

School of Medicine Issue

For the 13th consecutive year, the March issue of the JOURNAL is a special University of Kansas School of Medicine number. The scientific content of this issue is composed entirely of contributions from the school.

Dr. W. Clarke Wescoe, dean, contributed the introductory article. Dr. Vernon E. Wilson, associate dean of the school and an associate editor of the JOURNAL, assembled scientific copy, a series of nine articles on diversified subjects, and wrote the thoughtful editorial which appears below. The tumor conference reported in this issue was provided by Dr. Robert E. Stowell, of the Department of Pathology and Oncology, who performs this function in alternate months throughout the year.

Not represented here, but not to be overlooked, is Dr. Jesse D. Rising, of the Department of Postgraduate Medical Education, who edits clinicopathological conference reports which appear in issues in which tumor conferences are not carried.

The Editorial Board expresses its thanks to these persons, to the authors who wrote papers for this issue, and to all others at the school who have had a part in making this issue a credit to the university and to the JOURNAL.

Educare

To bring up or educate is the definition of the Latin word *educare*. It is closely related to the Latin verb *educere*, to draw out. In this stem or root of the present word educate is found a lesson often forgotten by teacher, student, and practitioner alike.

Acquisition of factual information and skills (both of which have only transient value) is and must be a by-product of the truly educational program; it is, of course, the goal of a technical or training program. Medical education programs are a judicious and, hopefully, carefully planned blend of training and education with the basic theme being that of education while the superimposed pattern is that of training in factual information. This concept, unfortunately, is so old and accepted that it is often ignored in the actual program.

It is trite, yet apparently necessary, to say that the field of medical information, as are most other fields, is too vast to be comprehended by a single person. As the peripheries of available information are pushed farther out, it becomes even more evident that the standards of excellence in medicine cannot be even approximated by assessing the factual information possessed by the individual. Thus the test of "bringing up" students into adulthood in medicine must be derived from a new set of measurements for medical performance.

What are the obligations of a medical school? To oversimplify, they may be described as dual in nature, first and most important the responsibility to the future patients of the embryo physician and second to the future physician himself.

In the complex field of medical knowledge it is abundantly clear that no person, however talented, can possess all of the information in the most circumscribed specialty field. This is further complicated by the fact that the "truth" or latest word is constantly changing. Authors of a textbook of pharmacology and therapeutics recently spent eight years attempting to get a text in reasonably current form to the press. Finally in desperation they sent the book to press, accepting the fact that some sections would be outdated at the time it reached the student.

The protection of the patient, then, is dependent not upon the factual knowledge possessed by the physician but by his judgment or wisdom. This characteristic is best described as his knowledge of his own abilities and limitations with an interest so centered that he is quickly willing and anxious to seek out the best possible available help for the patient who needs more than he can offer. This type of discriminating ability is partly inborn but best taught by intelligent and requiring example.

On the other hand, the acquisition of technical skills and factual information may conversely be considered to be directed primarily toward the best interests of the physician with a by-product being improved service to the patient. The uninformed physician who possesses judgment or wisdom, as described, may starve to death, but he will do no harm personally and will do much good through the services of others which are attained by intelligent referral.

Transmissions of judgment as defined above and the stimulation of intellectual curiosity are then the components of medical education programs which can be called truly educational. The learning of educational techniques and establishment of good study habit patterns must be considered to be in the grey area between education and training. It can be simply stated that the true role of medical education is the cultivation of the talent and aptitude for discrimination, self-examination, and zest for new knowledge. The medical school should open this door and indicate the path and horizons, but the traveler himself must make it a life-long trip and very quickly attain a self-energizing status.—*Vernon E. Wilson, M.D., associate dean, University of Kansas School of Medicine.*

Nominations for Society Offices

The Nominating Committee of the Kansas Medical Society for the current year presents the following slate of candidates for Society offices:

President-Elect

Dr. Frederick E. Wrightman, Sabetha; Washington University School of Medicine, 1917; cardiology.

First Vice-President

Dr. Harold M. Glover, Newton; University of Illinois College of Medicine, 1916; surgery.

Second Vice-President

Dr. Norton L. Francis, Wichita; University of Nebraska College of Medicine, 1935; otolaryngology.

Dr. H. Penfield Jones, Lawrence; Harvard Medical School, 1931; surgery.

Dr. H. Preston Palmer, Scott City; University of Kansas School of Medicine, 1929; general practice.

Dr. Lloyd W. Reynolds, Hays; Ohio State University College of Medicine, 1934; surgery.

Dr. Edward J. Ryan, Emporia; University of Kansas School of Medicine, 1936; internal medicine.

Constitutional Secretary

Dr. George E. Burket, Jr., Kingman; University of Kansas School of Medicine, 1937; general practice.

Treasurer

Dr. John L. Lattimore, Topeka; Fort Worth School of Medicine, 1918; pathology.

A.M.A. Delegate, 1960-1962

Dr. George F. Gsell, Wichita; Rush Medical College, 1933; ophthalmology.

A.M.A. Alternate, 1960-1962

Dr. Cyril V. Black, Pratt; University of Texas, Medical Branch, 1930; surgery.

Dr. H. St. Clair O'Donnell, Ellsworth; Washington University School of Medicine, 1917; medicine and surgery.

Dr. Robert Sohlberg, Jr., McPherson; Northwestern University Medical School, 1934; general practice.

Additional nominations may be made from the floor at the time of election, during the 100th annual meeting of the Society.

L. S. Nelson, M.D., Chairman
Conrad M. Barnes, M.D.
Clyde W. Miller, M.D.
Haddon Peck, M.D.
Henry N. Tiben, M.D.

Reserve Status

Two memoranda from the National Advisory Committee to the Selective Service System were received recently by Dr. Byron J. Ashley, Topeka, who served as chairman of the Kansas Medical Advisory Board to Selective Service during and after the period of the Korean conflict. They are reproduced here to answer questions which have come up repeatedly.

January 2, 1959

The National Committee has voted to notify medical schools and hospitals that if any of their staff or faculty are members of the Ready Reserve, they and the individuals concerned should make note of the fact that they will be expected to go when called and not be declared essential to the institutions at the time such a call is made.

If any such individuals are now in essential positions—either on faculty or staff—they should request transfer from the Ready Reserve to the Standby Reserve; otherwise the Ready Reserve is not a Ready Reserve.

By making such transfer they will, of course, lose pay. They will not lose credit toward retirement.

This should be looked into at the present time and straightened out now rather than waiting for an emergency to occur. In other words, it is essential for the medical schools and the hospitals to determine the military status of the members of their faculties and staffs. In that way and only that way will they realize what their loss would be on the day an emergency is declared.

This obligation of members of the Ready Reserve to serve when called also applies to physicians in private practice. Only in very exceptional cases would such individuals be given consideration for delay due to essentiality.

January 19, 1959

Our recent Bulletin No. 7 concerning members of the Ready Reserve on faculty of medical schools and all hospital staffs is, of course, not limited to the field of Medicine but applies to the entire health area as well as all other areas, i.e., Engineering, etc.

In other words, it is not a special situation as far as Medicine is concerned but applies to every member of the Ready Reserve.

Jaywalking was costly in the United States last year—2,600 were killed.

Maternal Mortality Report

This patient, a 30-year-old, gravida 4, para 3, died in a small moderately well equipped rural hospital after the spontaneous delivery of an 8-pound stillborn infant. Labor lasted eight hours. The patient had been seen by a physician three times prior to the onset of labor. Prenatal workup was considered minimal. The blood serology was negative and the hemoglobin was recorded as having been 14 grams on an office visit to the doctor. Blood type and Rh factor were not determined. No record was made of the presence of fetal heart tones either before hospitalization or afterward.

At the time of delivery there was a little more than the usual amount of bleeding, but apparently 45 minutes later the bleeding became profuse. All efforts to stop the bleeding, including packing of the uterus, failed. She was given 500 cc. of dextran and Levophed to combat shock. It was noted that bleeding occurred from the gums, needle puncture wounds, and any other traumatized areas. Blood loss was estimated at between 2,500 and 4,500 cc. There was no blood available locally, and only a belated effort was made to type and cross match the patient. The blood obtained for that purpose was reported as uncoagulated three days after its withdrawal.

The certificate diagnosis was recorded as "postpartum hemorrhage due to hypoprothrombinemia, due to amniotic fluid embolus." This diagnosis is supported by the profuse uncontrolled hemorrhage from the uterus associated with spontaneous bleeding from mucous membranes and minor areas of trauma. It is substantiated by the fact that the patient's blood did not clot in vitro even after three days.

Failure of the blood to clot is due to a deficiency of fibrinogen. Treatment consists of giving fibrinogen, and the replacement of blood loss. The condition is not common, but it is more likely to occur in amniotic fluid infusion, abruptio placenta, and intrauterine death of the fetus, especially between the third and sixth months of gestation.

Committee opinion: The committee felt that the certificate cause of the death was correct and that the physician was in error in not recognizing the emergency and making every attempt to replace blood loss, and for not recognizing the specific coagulation defect and making an attempt to procure fibrinogen. It further felt that the hospital was at fault for not having blood and fibrinogen on hand.

Classification: Obstetric death—preventable.

One of a series of case reports prepared by the Committee on Maternal Welfare to illustrate the type of study made in each instance of maternal death in Kansas.

THE MONTH IN WASHINGTON

Editor's Note. The following summary of Washington news was prepared by the Washington office of the A.M.A. for distribution to state and regional medical journals.

Contrary to the usual procedure in a first session, the 86th Congress this year already is getting on with its work, particularly in health fields. In past Congresses, not much is accomplished the first session, with most bills held over to the second, which always is an election year.

The session was only weeks old when action was under way. Here are some of the developments, portending enactment before adjournment of a number of bills:

1. After hearings, a subcommittee of the Senate Banking and Currency Committee reported favorably on a housing bill that contained provision for mortgage guarantees for proprietary nursing homes. Subsequently, the measure was passed by the Senate.

At this writing the House is at work on another housing bill that also contains the nursing home loan section. With House passage assumed, the question is whether the bill (containing more money than the White House wants spent) will be vetoed, and if vetoed whether it can be enacted anyway by two-thirds majorities in both houses.

2. Without bothering with hearings, the House Ways and Means Committee overwhelmingly approved the Keogh bill to encourage retirement plans for the self-employed. It acted in line with the committee's established procedure to quickly reapprove bills that passed the House the previous Congress, but not the Senate. The Keogh bill is identical with a measure that easily cleared the House last session but lost out in the Senate.

3. Driven forward by Chairman Carl Vinson of the House Armed Services Committee, legislation to extend the regular and doctor drafts four years rolled through the House. However, indications were the Senate would take its time and give careful consideration to the need for a four-year extension.

4. The Senate Labor and Welfare Committee, under the leadership of Chairman Lister Hill (D., Ala.), demonstrated its interest in legislation for the aged. Senator Hill named a subcommittee to make a full year's study of problems of the aged, taking in housing, employment, and recreation, as well as medical aspects.

Chairman of this subcommittee is Senator Pat McNamara, Detroit Democrat. Other Democrats are Senators John Kennedy of Massachusetts, Joseph Clark of Pennsylvania, and Jennings Randolph of West Virginia. Republicans are Senators Everett Dirksen of Illinois and Barry Goldwater of Arizona.

5. At the same time, three members of the standing health subcommittee of the Hill Committee, Senators Jacob K. Javits of New York, Clifford B. Case of New Jersey, and John Sherman Cooper, all Republicans, asked Congress to authorize a two-year study of the health problems of the entire population. If approved by Congress, the investigation would look into the quality and quantity of health services, problems of extending health insurance, special problems of aged and minority groups, and the distribution of health services.

Notes

Fifty-four Senators are supporting legislation that would project the U. S. farther into the international medical picture. It would set up an Institute of International Medical Research as part of NIH, establish an advisory council, and authorize spending of $50 million a year for research, part of it to go to foreigners in the form of grants.

Medicare has not been able to keep within the $72 million "ceiling" recommended by Congress for the present year. Through the Navy it is asking $6 million more. In addition, Army and Air Force will shift funds to meet the bill, estimated at $93.6 million. The budget asks $89 million for next year, in expectation that restrictions begun in October will bring a saving of between $4 million and $5 million.

Medicine has won an argument within the new Federal Aviation Agency. As a consequence, FAA's civil air surgeon will assist the administrator in setting standards for fitness, direct physical examination and inspection programs, advise on research needs, and evaluate all of FAA's medical personnel plans.

The President's health budget, now under scrutiny in Congress, is expected to be substantially increased. As an example of the White House efforts for economy, Mr. Eisenhower recommended $101.2 million for Hill-Burton hospital construction grants, in contrast to $186.2 million HB has for the current fiscal year.

Through the Civil Service Commission, the federal government is attempting to recruit physicians for service in this country and abroad. Salaries range from $7,510 to $12,770.

The Administration is pressing Congress to pass legislation giving the U. S. power to regulate coal tar and other colors in foods, drugs, and cosmetics. One objective is to require that manufacturers demonstrate that the colors are harmless before the products can be put on the market.

BLUE SHIELD

Student Enrollment at Kansas University

A new comprehensive health protection plan was made available to all full-time Kansas University students at the beginning of the second semester this year. It is underwritten by Kansas Blue Cross-Blue Shield, and, according to Dr. Franklin D. Murphy, chancellor at the University of Kansas, "will supplement the benefits of the present Student Health Service and provide considerable additional hospital-medical-surgical care."

Sponsored and endorsed by Kansas University All Student Council's Health Commission, this supplementary health plan is being made available as the result of efforts on the part of both faculty members and the students' organization.

Chancellor Murphy, in explaining to parents and students the addition to the health and welfare program of the University of Kansas, had this to say: "The Blue Cross-Blue Shield Plan was adopted after long and serious study of health insurance plans. It will provide protection for both single and married students, including dependents, at a nominal annual cost. It offers hospital coverage in addition to that already provided through the university's present program, as well as prescription drugs, diagnostic x-rays, and supplemental accident coverage.

"We emphasize," he went on to say, "that this coverage also includes protection off-campus and during the summer, and it will be provided at a cost much lower than that these same people would pay for any other outside program."

In Conjunction with Present Plan

The new plan, in conjunction with the hospital care already provided on the campus, will include almost complete coverage at an anuual cost of $17.50 for single students and $97.25 for family coverage.

Chancellor Murphy has pointed out that "this is probably the most complete and least expensive health protection program ever offered to students in this area. It is actually a greatly-extended health protection program for our students and their dependents."

Voted by Students

Officers of the All-Student Council at Kansas University gave enthusiastic approval to the program which will dovetail into the existing Student Health Service, after a survey indicated many students would be interested in purchasing such a program.

The new plan, purchased by the student, covers many of the phases of health protection not provided by the Student Health Service. It also covers dependents, which Kansas University's present service does not.

Laurence C. Woodruff, dean of students, pointed out that the present program limits in-hospital care to certain services in Watkins Memorial Hospital on the campus, while the new program offers almost complete coverage in Watkins Memorial or any other approved hospital. Out-patient services are extended under the new program, as well as coverage for dependents.

Dean Woodruff summarized, "This program has been carefully developed by a committee of faculty and students as best suited to the needs on our campus."

Unique for Blue Cross-Blue Shield

This is the first time that Kansas Blue Cross-Blue Shield has participated in a program of this kind for students and their families. Two other Kansas colleges, however, are enrolled in Blue Cross-Blue Shield on a "student only" basis. Enrollment of college students at Washburn University in Topeka and at St. John's Lutheran College at Winfield took place in the fall of 1957. In each of these schools the health protection program is for individual students and not for their families. Memberships for families there are available through the regular non-group type enrollment which Blue Cross-Blue Shield makes available on a continuous schedule.

Managing Editor Resigns

Miss Pauline Farrell, managing editor of the JOURNAL OF THE KANSAS MEDICAL SOCIETY since 1944, has resigned to become assistant registrar at the University of Kansas School of Medicine, Kansas City. She begins her new duties on March 16.

Smith Kline & French Laboratories announces the establishment of an independent research organization in Great Britain to supplement the firm's own extensive Research and Development Division in Philadelphia and to provide the company with a direct link to European science.

The new Smith Kline & French Research Institute of Great Britain will be headed by Professor William A. Bain, who has held the chair in pharmacology at the University of Leeds since that post was created in 1946. He will guide a staff of 40.

Smith Kline & French said the establishment of a research organization on the continent has been under study since the early 1950's. SKF has long been a leader in scientific exchange programs, and, for example, initiated early this year the first official exchange of pharmaceutical and medical research personnel with the Soviet Union.

Tumor Conference

Paraplegia in Hodgkin's Disease of the Dura

Edited by BONITA J. PETERSON, M.D.

Dr. Boley (Moderator): Involvement of the central nervous system by malignant lymphoma is a well recognized form of neurological disease. In both Hodgkin's granuloma and Hodgkin's sarcoma, the most frequent neurological lesion is an epidural tumor mass compressing the spinal cord. This complication is illustrated by the following case.

Mr. Neal (Student): This is the case of a 27-year-old white woman with known Hodgkin's disease for eight years. The diagnosis was made elsewhere by biopsy of an enlarged axillary lymph node. She was seen here shortly thereafter with enlarged left cervical and supraclavicular lymph nodes and a large, lobulated hilar mass. These were treated successfully with radiotherapy. She was then followed at regular intervals and enlarged lymph nodes were treated by radiotherapy as they appeared.

About 18 months ago she had back pain due to compression of the fifth and seventh dorsal vertebrae, presumably secondary to involvement of these vertebrae by lymphoma, and she has worn an orthopedic brace since then. Four months ago she again had back pain and there was radiologic evidence of destruction of the 12th dorsal vertebra and the adjacent portion of the 12th rib. This area was also treated by x-ray.

One week before admission she began to have numbness of her feet. The numbness rapidly progressed upward to her nipple line and was accompanied by muscular weakness of her legs. On admission she had difficulty rising from a supine position and walked with a broad-based ataxic gait. Vibration and position sense were intact, but there was a distinct sensory level with hypesthesia below D5. Her deep tendon reflexes were hyperactive. Her Babinski response was plantar bilaterally.

Dr. Davidson: Roentgenograms taken here 18 months ago showed approximately 50 per cent compression of the vertebral bodies of the fifth and seventh dorsal vertebrae with a developing kyphosis. Four months ago roentgenograms showed approximately 60 per cent compression of the fifth and 75 per cent compression of the seventh dorsal vertebra. Each appeared as a V-shaped structure and had a rather solid appearance as though the destructive process were stable (Figure 1). The new abnormalities at that time included destruction of the pedicle of the 12th dorsal vertebra on the right and of the adjacent portion of the vertebral body and articular surface of the 12th rib. No soft tissue masses were seen.

On this admission the above changes are again seen. There is no apparent progression of the destructive lesions except for a loss of the fifth dorsal pedicle on the left.

Dr. Williamson: When I first saw this patient, she was able to walk, although her legs were weak Radiologically and neurologically her lesion was at D5, and the logical explanation of her symptoms was compression of the spinal cord at this level by lymphoma. At that time I was trying to avoid a laminectomy, although, in retrospect, laminectomy might have

Figure 1. Roentgenogram showing compression of the fifth and seventh dorsal vertebrae with kyphosis.

Cancer teaching activities at the University of Kansas Medical Center are aided by grants from the National Cancer Institute, U. S. Public Health Service, and from the Kansas Division of the American Cancer Society. Dr. Peterson is a trainee of the National Cancer Institute.

been the treatment of choice. We debated this issue, and Dr. Tice began radiotherapy with the hope of obtaining the good result obtained on many previous occasions. However, within two days the patient became totally paraplegic, and we performed an emergency laminectomy. She continued to have total motor paralysis after surgery for about six days, and then motor return began. Dr. Tice, is edema the immediate response of the tumor to radiotherapy, and does that explain the results in this case?

Dr. Tice: I think this case illustrates the phenomenon of edema very well. She became obviously worse after her first treatment by a rather routine dose of 300r. Tumor enclosed in a bony cage, as in this case, can develop enough edema to increase significantly the pressure on adjacent structures.

After surgery we gave only 100r on each of the first two days and then increased the dose to 200r. After the larger dose, she became neurologically worse, and we decreased the amount to 100r. She now is getting 200r without untoward consequences.

Dr. Williamson: Since this patient is young and in good physical condition, and since her sensation was never completely absent, I expect her to recover motor function rapidly. She should be walking unaided in six weeks.

At surgery we found firm fibrous tumor wrapped around the spinal cord in the extradural space. The tumor was attached to the dura but could be stripped from it. The laminae of the third, fourth, and fifth dorsal vertebrae were removed. We did not attempt total removal of the tumor. In a case like this we remove only the dorsal portion to obtain decompression of the spinal cord and then rely on radiation to control the residual tumor.

Dr. Mantz: The specimen we received was a few small fragments of tissue consistent microscopically with the diagnosis of Hodgkin's disease made nine years ago. There are two components of the tissue: a highly cellular element representing tumor and a dense fibrous element representing fragments of dura. The cellular components include giant cells, occasionally multinucleate, with multilobulated nuclei, corresponding to Reed-Sternberg cells. The preoperative radiotherapy explains the relative paucity of lymphocytes throughout the stroma. In addition, edema is a factor reducing the density of the cellular components. Other cellular elements include eosinophils, polymorphonuclear leukocytes, plasma cells, reticulum cells, and spindle-shaped fibroblasts to complete the rather characteristic picture of malignant lymphoma of the Hodgkin's type. This particular tumor could be classified as a Hodgkin's granuloma.

Extradural lymphomas are not uncommon. Though they probably arise more frequently from adjacent bone, they may arise from reticuloendothelial deposits normally present in the extradural space and need not involve the adjacent bone.

Dr. Williamson: Of all extradural tumors, the most common is metastatic carcinoma. The second most common is lymphoma. In this hospital at present there are three patients with paraplegia secondary to lymphomatous involvement of the dura producing spinal cord compression. This, therefore, is not a rare complication of lymphomas.

Dr. Tice: We plan to give 2700r, hoping to destroy the tumor. Approximately the same amount was directed to the same area for treatment of bony involvement previously. Since there is little soft tissue intervening between the skin and the vertebral column, the patient may develop skin damage necessitating plastic surgery later.

Dr. Mantz: Concerning prognosis of malignant lymphomas in general, the upper limit of life expectancy usually cited is 18 years. Jackson and Parker have reported survivals as long as 24 years with Hodgkin's disease.[4] Therapy in this case has not as yet included nitrogen mustard and related alkylating agents which can be used when the limit of tolerance to radiation has been achieved. Therefore, this patient may have a few more years of relatively good life.

Dr. Tice: I am following perhaps six patients with Hodgkin's disease who have already survived 10 to 15 years. The frequent recurrences in the present instance would seem to indicate that the patient may soon succumb to her disease. Usually the course of the disease is shortened considerably by the advent of spinal paraplegia, but isolated patients have survived a year of two following this advent.[5]

Dr. Williamson: It is said that radiation is better than nitrogen mustard as therapy for single isolated areas of lymphoma. On the other hand, if the patient has systemic involvement with fever and generalized adenopathy, nitrogen mustard is the preferred treatment.[1, 2] An advantage of nitrogen mustard in the present instance might have been the absence of the initial edema obtained with radiation.

Craver suggests that when a patient with known malignant lymphoma presents himself with paraplegia of recent origin, or when he develops such symptoms as paresthesias and beginning loss of motor function, he should be regarded as having an emergency condition. Lumbar puncture and myelography are to be avoided, and laminectomy is not recommended. He suggests that appropriate radiotherapy should be planned, usually to be preceded by a full dose of nitrogen mustard in one injection. The so-called decongestant effect of the nitrogen mustard may help reduce the congestant effect of the initial dose of radio-

therapy.[3] Total paraplegia, as occurred in the present case, may thereby be avoided.

References

1. Bethell, F. H.; Andrews, G. A.; Neligh, R. B., and Myers, M. C.: Treatment of Hodgkin's disease with roentgen irradiation and nitrogen mustards, Am. J. Roentgenol. 64:-61, 1950.
2. Craver, L. F.: Treatment of tumors of the lymphatic system, N. Y. State J. Med. 55:1762-1765, 1955.
3. Craver, L. F.: Reflections on malignant lymphoma, Janeway lecture 1956, Am. J. Roentgenol., Radium Therapy and Nuclear Medicine 76:849-858, 1956.
4. Jackson, H., Jr., and Parker, F., Jr.: Hodgkin's disease, VII, treatment and progress, New Eng. J. Med. 234:103-110, 1946.
5. Sparling, H. J., Jr.; Adams, R. D., and Parker, F., Jr.: Involvement of the nervous system by malignant lymphoma, Med. 26:285, 1947.

Examination of Foreign Graduates

Results of the first world-wide American Medical Qualification Examination held September 23 in 30 United States examination centers and 30 foreign centers were announced recently by Dr. Dean F. Smiley, executive director, Educational Council for Foreign Medical Graduates, 1710 Orrington Avenue, Evanston, Illinois.

The foreign centers were established in Latin America, the Far East, the Middle East, and Europe.

Statistics reveal that of the 844 foreign-trained physicians taking the examination, 418 passed and will receive the ECFMG Certificate. According to the council, these physicians are certified as possessing medical knowledge reasonably equivalent to that expected of graduates of approved American and Canadian medical schools and as having satisfactory facility in the English language.

Examination results also indicate that 226 candidates came sufficiently close to passing, in spite of language difficulties, to earn temporary certificates which will qualify them to study not more than two years as interns or residents in U. S. hospitals approved for internship or residency training.

The American Medical Qualifications Examinations for 1959 are scheduled for February 17 and September 22. To be admitted to these examinations the candidate is required to present, three months in advance, an application and credentials confirming that he has had 18 years or more of formal education, at least four of which have been in a recognized school of medicine.

Other sponsoring organizations of the examinations are the Association of American Medical Colleges, the American Hospital Association, the American Medical Association, and the Federation of State Medical Boards of the United States.

Correction

A paper on "Dumping Syndrome—Recent Changes in Concept of This Common, Distressing, and Hence Important, Postgastrectomy Development," which was published in the January issue of the JOURNAL, contained one sentence which might be confusing. The author, Dr. J. Walker Butin, Wichita, notes that one word should be changed in a sentence appearing on Page 6, right-hand column, last paragraph, Line 9. The sentence should read "These increases in blood flow are of the magnitude of 1½ to 12 times control values, and the severity of the vasomotor symptoms seems directly correlated with the degree of such increase."

DEATH NOTICES

CLAIB BOSWORTH HARRIS, SR., M.D.

Dr. C. B. Harris, 83, Garnett physician who had been an honorary member of the Anderson County Medical Society since 1949, died in Trinity Lutheran Hospital in Kansas City, Missouri, on February 4. A graduate of University Medical College of Kansas City in 1906, Dr. Harris was honored by the county society on his 50th anniversary of practice in 1956. Among the survivors is a son who is also a member of the Kansas Medical Society, Dr. C. B. Harris, Jr., Garnett.

JACOB FRANKLIN GSELL, M.D.

A physician who served the Sedgwick County Medical Society as its first president in 1903, and the Kansas Medical Society as its president in 1937, Dr. Jacob F. Gsell, 85, died at Wichita on February 12. He had been in retirement since 1953 and was an honorary member of the Society.

A graduate of Rush Medical College, Chicago, in 1895, Dr. Gsell began practice in Richmond, moving to Wichita five years later. He was a member of the American Academy of Ophthalmology and Oto-Laryngology and a fellow of the American College of Surgeons.

Among the survivors is a son, Dr. George F. Gsell, Wichita, who specializes in ophthalmology.

Government Medicine

The Doctor and the Health Scheme in Great Britain

JOHN D. DOUGHERTY, M.D., *Honolulu*

Much has been written about the entrance of the federal government into medicine. Even now, through the Forand Bill, an attempt is being made to legislate "free" medicine for the aged. With so much of medicine's future involved, the American Medical Association set up a fund for the preservation of the American approach to medical care.

With the thought of settling my own mind, I was grateful for the opportunity to view the British Health Scheme during the summer of 1957 at the height of the recent disagreement between physicians and the Ministry of Health. On my return, my colleagues showed such interest in my experience that I was encouraged to investigate the matter more fully, and I hope to have achieved an appraisal of the health scheme, its history, and its present problem with the physicians of Great Britain.

The British government first began to subsidize medicine in the 17th century[1] when foundling homes and lying-in hospitals were organized for the indigent. However, the Poor Law which incorporated these feeble gestures was found to be much more expensive than originally anticipated, and in some cases it encouraged people to seek relief at the expense of gainful labor.[2]

The next change of note in Poor Law policy came in 1834 when the government became explicit in discouraging unemployment, to the extent of making relief such an unpleasant form of existence that no one would choose it in preference to work.[3] Of significance to the medical profession of the day was the authority given to local commissioners who could provide care for inmates of local workhouses. However, the administration of pauper health immediately degenerated into political patronage, as was evidenced by this editorial comment:[4] "The powers conferred on the commissioners are literally frightful. Mr. McFarland Lewis, it seems, is a man who *does not forget his friends,* but it would be wise in him to refrain from indulging his feelings of partiality for a gang of monopolists and corruptionists, at the expense of justice and morality."

Later, in the 19th century, the first constructive and effective legislation finally appeared. Following a world wide cholera epidemic, the government realized that some aspects of disease were of national concern.[5] In 1875 a comprehensive public health law appeared with the first attempt at sanitation control.[6] Efforts made to curb infectious disease and the sudden spurt in medicine's ability to cure resulted in increased public consciousness regarding health. The first response on the part of the wage earner was to form closed panel health clubs.

The service of these panels was often perfunctory, and it was generally agreed that good medical care was not rendered.[7] Men became dissatisfied and, with universal male suffrage, their votes became of real concern in Parliament. In America, such men gained a sufficient increase in their real wages to enable them to purchase individual care.

But British labor had a different problem. Their real wages did not increase as did those of the American worker. And like wage earners the world over, they found that the cost of medicine rose in excess of their wage increases. They turned to the government for a solution, and in 1912 socialized medicine began in Great Britain.

David Lloyd George promoted the Poor Law of 1912 which was revolutionary in its benefits.[8] Among other things pertaining to unemployment, etc., the law provided that men earning less than 250 pounds per year were backed by the government in a National Health Insurance Scheme. Though well received by labor at the time, workers were soon dissatisfied[7] for: (1) care was provided only for the worker, not for his family, (2) the scheme did not provide for care beyond that of the general practitioner.

Thus, in 1942, labor turned again to the government. But this time they were not alone, for physicians found private cases few and charity patients many, imposing a great financial sacrifice upon the physician who practiced in an industrial area.[8, 9]

A commission[10] under the direction of Sir William Beveridge studied the entire social system and concluded that provision of an adequate social system required maintenance of the population from want. For this, three assumptions were listed: (1) children's allowances, (2) comprehensive health and rehabilitation, and (3) maintenance of employment. They further decided that whatever the method of acquir-

---

This is one of a group of theses written by fourth year students at the University of Kansas School of Medicine, selected for publication by the Editorial Board from a group judged to be the best by the faculty at the school. Dr. Dougherty is now serving his internship at Tripler Army Hospital, Honolulu, Hawaii.

ing funds, in the final analysis, the average man could not bear the cost of the plan on a contributory basis. The answer was determined to be progressive taxation.

Why the British working man—and nation as well—failed to participate more fully in the industrial revolution has been a puzzle to many. The loss of colonies was a severe jolt as the importation of materials and foodstuffs from outside the Empire tended to deplete the nation's capital. That would be true unless exports brought back the same currency. To operate successfully under such conditions requires a great deal of industrial efficiency; but here Great Britain, with "make work" unionization and welfare states, is sadly lacking.[11]

An interesting article in the monthly newsletter of the First City National Bank of New York[12] compares the economic systems of Great Britain and Germany, notes the results since World War II, and arrives at the following conclusions: (1) *punitive* taxation of the most productive elements of society for the welfare of the marginal laborer, and (2) resistance to automation, which is another way of saying increased productivity of man. Both work to the detriment of the whole economic society with the marginal laborer ending worse off than before.

Whatever the cause, since the last war, Great Britain has been in a state of recurrent economic crisis. The natural result is that the government pays no more for any service than it must. While tradesmen have never been reluctant to strike and clerical workers to shift positions if the price is right, the government was forced to keep the wages of such occupations in tune with money cycles. But the doctor has no alternative, and, having an altruistic mind, hesitates to strike; thus, with no bargaining point, he has found little sympathy from the Ministry who did not intend to raise his pay until forced to do so.

To make matters worse, the doctor was economically behind the inflationary spiral to begin with, and the history of the present disagreement has many roots from the beginning of the Health Service in 1948.

When accepting the Health Scheme, the physicians did so on the basis of the Spens Report[13] which stated that pay should be based upon: "The normal expectation of general medical practice in the past and the desirability of maintaining in the future, the proper social and economic status of general medical practice and its power to attract a suitable recruit."

Feeling that the government intended to follow this principle, the profession accepted the issue on faith, not getting a contractual agreement from the government. Both government and doctors agreed upon 1939 as a base line from which to make adjustments according to financial trends. However, the physicians, expecting an increase of over 100 per cent of the 1939 figure, were stunned by the government's offer of 20 per cent. In order to settle the dispute, a court arbitration was agreed upon, resulting in 1952 in a 100 per cent increase.[14] Since this notable decision under Justice Danckwertz, the Ministry of Health has not allowed arbitration of renumeration.

By 1956 the monies being paid were the same, but, of course, bought much less. Repayment of expenses lagged far behind, and in April[15] the physicians petitioned the Ministry of Health for an increase of 24 per cent. A few months later they were given a curt refusal and were told they should ask for what they felt they could get, not what they deserved.[16]

In November of 1956 the Ministry stated that doctors had no legal grounds for an increase;[17] if they disagreed with this ruling, they could take the matter to court.

In December the physicians acknowledged the lack of legal grounds and, seeing that further appeal was useless, in February announced their intention to strike if there were no arbitration.[18] Soon after this move, the government began to show some sympathy for their plight and set up a Royal Commission to study the issue.[19] The doctors felt that although the terms of reference[17] were slanted against them, the best course would be to hear the commission's recommendations before planning further action. They were encouraged to follow this course by the commission's assurance that all possible haste would be made.

Thus, the commission was organized in March, 1957, almost one year after the doctors first petitioned for higher pay. This commission is *still* considering evidence at the time of this writing!

At the same time, the ever more intimate relationship between government, physician, and patient was being carefully ignored by the American practitioner. This may be so because in spite of all the "free" care being provided by the government, the control that usually accompanies such funds has not yet appeared. Perhaps a fuller appreciation of the freedom of practice in the United States might be gained from the following illustrations of medical practice in Great Britain. A general practitioner, on completion of his training, has four choices: (1) independent practice, a form of medicine practiced by less than 5 per cent of Great Britain's physicians, most of whom deal with the highest income groups; (2) the foreign service; (3) the armed forces, and (4) the National Health Scheme.

It is the latter to which the young man most frequently turns and is given a list of available positions. Should he prefer to practice in a locality which the directors consider sufficiently staffed, the health serv-

ice requires him to make another choice. Then, if he is willing to assume the burden of building two practices, he is employed at a suggested position while waiting for an opening at the preferred location.

Once established, the generalist is almost completely limited to out-patient, house, and emergency care, a doctrine which encourages a form of caste society that leaves little challenge to any but the specialist who is placed at the top.

However, not all is well with the specialist. When the government took over the hospitals, it set up a staff quota which was considered sufficient to provide specialist care. At that time the older, more established physicians chose to remain in private practice, having only part time consultancies with the health service.

The full time posts were then filled by young men, just finished with their residencies, who saw an opportunity to practice the highest standard of medicine with a corresponding level of income and security. These specialists now constitute a serious block to the ambitions of young men only a few years behind.[20, 21]

Since most positions will remain filled for several years, succeeding aspirants have remained as senior house officers at a salary of one-third to one-half that of the full time consultants.

While these illustrations are hardly flattering to the health service, they echo the complaints of most doctors interviewed. It was difficult to find a *recent* example in which the Health Scheme worked to the betterment of the physicians. None the less, most of the doctors agreed that things were going badly for the public until the government stepped in. In Great Britain a substantial proportion were unable to actually pay for their medical care.[7] Unlike the United States, this number was so large that part time and municipal charity, as practiced here, was unequal to the task. The Health Scheme, by paying for all medical care, took up the slack, and for a time both doctors and patients were provided for.

The public has remained satisfied, the doctors have not. They have no method of adjusting their salaries to economic cycles. Such measures as the threatened strike may yield pay increases, but certainly they do the profession no long-term good.

Their supervision by lay administrators has been a source of grief to many clinicians. From the outset, the Health Ministry has been primarily concerned with the public's immediate health, remaining somewhat apathetic toward the needs of physicians. Such a position was felt to produce prompt results in patient care, but at the same time it fostered dissatisfaction within the profession and certainly made medicine less desirable as a career.

Finally, those interviewed repeatedly expressed the feeling that they had become civil servants, not only to serve but also to be governed by their public. They noted a loosening of the old patient relationships and a surprising lack of concern on the part of their patients for the plight of medicine. As one young physician put it, "It's much like the post you know. So long as you're getting your letter on time, you don't have much sympathy for the carrier."

Certainly their complaints were well grounded and worthy of note in this country, for most often they would ask for a comparison with the United States and then end by saying how fortunate we Americans are to have thus far kept the management of medicine within the profession. The point most strongly brought out was the necessity for a careful scrutiny of every new national health measure, for defects are difficult to remove for a group of voters as small as physicians. Nowhere was this more strongly emphasized than by an industrious young layman in the Ministry of Health. When hearing of my numerous interviews with doctors, he handed me a huge pamphlet of statistics saying, "Pity to waste your time talking to doctors. Everything you'd possibly want to know is contained here."

I found it difficult to maintain an objective curiosity regarding the Health Service. In all fairness, attention must be called once more to improvement in care, claimed by laymen and physicians interviewed. However, because of the alarming amount of petty, thoughtless, government control, it is hard to imagine such a system being successful in this country. Forgetting the present question of salary, the American, whatever his vocation appears to be, is much more resentful of bureaucratic restrictions than the Briton.

Also I doubt the sagacity of choosing lay administrators. Certainly one of the pitfalls of any large health service is the risk of dehumanizing medical practice, both for the patient as well as for the physician.

Finally, whatever the course prescribed for medicine in the next decades, surely something has been learned from the misfortunes of the profession in Great Britain. Even better than I, one physician summed up our problem when he said, "Every time you master another disease, you attract the attention of perfectly sincere labor leaders and politicians. So long as you make medicine widely available to their constituents, you'll have nothing to fear. It is only when they think they can improve on your efforts that problems begin."

Bibliography

1. History of the English Poor Law. G. B. Putnam's Sons, Vol. II, p. 68, 1898.

2. History of the English Poor Law. G. B. Putnam's Sons, Vol. II, p. 209, 1898.
3. English Poor Law Policy. Lougermans, Green and Co., p. 3, 1910.
4. The Lancet, II, 897, 1834-35.
5. The Lancet, II, 669, 1833-34.
6. The Lancet, II, 371, 1875.
7. Pamphlet of information received from the Ministry of Health, London.
8. The Lancet, II, 124, 1912.
9. Personal Communication.
10. Supp. British Medical Journal (Feb. 6) 1942.
11. The Reporter, p. 47 (May 15) 1958.
12. The Monthly News Letter, First National City Bank of New York (March) 1958.
13. Supp. The British Medical Journal, I, 765 (May 18) 1946.
14. Supp. The British Medical Journal, I, 113 (March 29) 1952.
15. Supp. The British Medical Journal, II, 71 (July 21) 1956.
16. Supp. The British Medical Journal, II, 93 (Aug. 4) 1956.
17. Supp. The British Medical Journal, II, 1290 (Dec. 1) 1956.
18. Supp. The British Medical Journal, I, 108 (Mar. 9) 1957.
19. Supp. The British Medical Journal, I, 527 (Mar. 2) 1957.
20. Supp. The British Medical Journal, II, 159-160 (Oct. 20) 1956.
21. Personal Communication.

Directory of Blood Facilities

The first comprehensive directory and description of blood facilities and services ever complied in this country was released recently by the Joint Blood Council, a nonprofit national organization with headquarters in Washington, D. C.

It shows the location of facilities, the extent of their operations, how they are organized, what specific services they offer and other information of importance to physicians, hospitals and any person or organization interested in blood and its derivatives.

The directory is based on data obtained from a detailed questionnaire sent to all known blood banks, hospitals, and clinics that offer blood-handling services. The questionnaire was sent to 3,150 institutions and 2,202 replied. Those that failed to return the information will have an opportunity to supply it for future directories.

"The directory supplies vital information long needed by physicians, hospital staffs, and others associated with the practice of medicine," according to Dr. Leonard W. Larson of Bismarck, North Dakota, president of the Joint Blood Council. "We now for the first time have a central reference and index to institutions and agencies concerned directly or indirectly with the therapeutic use of blood and its derivatives. We are grateful for the cooperation we received and are satisfied that the information presented is as complete as possible at this time. We are looking forward to listing virtually every blood facility in the United States in future revisions of the directory."

The directory will be distributed free by the council to all institutions and organizations that participated in its preparation, according to Dr. Frank E. Wilson, executive vice president.

Information brought out in the survey and directory includes the following:

1. Of the facilities listed, 1,832 administer whole blood. Also 1,287 administer plasma, 1,021 serum albumin, 994 packed red blood cells, and 311 platelets, with many of the facilities engaging in a number of these activities.

2. Many of the institutions also are engaged in storage of other body tissues. Artery banks are maintained by 116, eye banks by 36, bone banks by 200, skin banks by 24 and mother's milk banks by 20.

3. A total of 1,325 blood banks store whole blood, record donor histories, and have as their primary purpose the recruitment of donors and complete laboratory blood processing. The directory shows whether these banks obtain less than half or more than half their blood from their own recruiting efforts and whether blood processing includes compatibility (crossmatch) testing.

4. Two out of every three organizations listed have no reciprocity system for the exchange or resupply of blood. Of the remaining one-third, which do participate in a national system, 470 use the American Red Cross system, 240 that of the American Association of Blood Banks, and 110 use both systems.

5. Community blood banks and Red Cross regional centers present an entirely different picture with regard to reciprocity, as shown by these data:

Reciprocity System	*Community Banks*	*Red Cross Centers*
American Association of Blood Banks	62	0
American Red Cross	0	41
Both AABB and Red Cross	19	8
None	18	0
Total	99	49

The directory is the forerunner of a complete report of the activities of most organizations engaged in blood services of any kind. This forthcoming report will present the details of operations, quantities and persons serviced, practices and procedures, and other statistical data which were collected during 1957 and 1958 under a project directed by a committee of eminent physicians and scientists.

Economics in Medicine

Records to Be Kept for Income Tax Purposes

FLOYD F. WEHRENBERG, ***Kansas City, Missouri***

For some reason, one of the most painful expenses to be paid is income tax. Since you may be paying from 25 to 50 per cent or more of your cash receipts in income tax, close attention should be given to this expense.

While there are certainly definite rules about income tax deductions, you are not without some control, and it will be to your advantage to exercise this control. Adequate records to reveal and substantiate all possible deductions, and expert counsel to help you recognize those deductions, may save you a great deal of money and concern.

The items most frequently questioned on a doctor's tax return are conventions, organizational dues, business promotion, and car expenses. Let's consider the steps you can take to assure maximum deductions for each item.

Conventions

It is important for you to keep all hotel receipts and a careful record of expenditures for travel and meals when you attend a convention. File these together, identifying the convention, the date, and the place. Remember that you will be expected to have higher expenses in a large city than a small one, so the place is of importance. If your wife accompanies you, she will be your guest and not Uncle Sam's. You cannot deduct any of her expenses.

You are permitted to belong to a medical study club and deduct the fee as a legitimate business expense. You are also allowed to take postgraduate courses if such a course merely enables you to maintain your status and ability. Courses in preparation for a specialty are not deductible.

Dues and Entertainment

You may claim as a deduction the dues you pay for membership in national, state, and county medical societies as well as for those specialty societies to which you belong. Membership in your city's Chamber of Commerce and Better Business Bureau is also considered a legitimate expense. Obviously the Bureau feels that you have a civic duty to belong to the former and that the latter is necessary to your practice.

As a general rule, other club dues are not allowable. However, some agents will permit a specialist to deduct part of his country club or social club dues if he can prove that the memberships are *necessary* to him to obtain referrals. It is always helpful if you can show how association with other doctors at a particular club has led to referrals from that doctor.

When you entertain, keep a list of your guests together with the place and cost. (You may not, of course, include your own expenses.) Then be sure that you can go to your files and prove that you received referrals from those persons or that they have helped you in a concrete way. If you can do that, most agents will allow these deductions as "ordinary and necessary." A specialist will be permitted to entertain more than will a general practitioner whose practice does not depend upon referrals.

Car Expense

A doctor is generally allowed one car for business and one for personal use. If this is your situation, you have no problem. You need only keep the expenses separate so you will have an accurate list of your deductible expenses. However, if you have only one car, it will be necessary for you to determine what percentage of the expenses are business, and then apply that percentage to the total expenses before claiming the deduction. Naturally the percentage varies from doctor to doctor, depending upon how much each is required to use his car for business reasons.

Keep an accurate record of all your expenses and be prepared to prove them. Then let your tax consultant tell you what to claim. The combination of wisdom in your claims and proof in your records will assure you that your income tax is kept to a minimum.

Mr. Wehrenberg is Missouri-Kansas manager, Professional Management Mid-West, 4010 Washington Street, Kansas City, Missouri.

THE KANSAS PRESS LOOKS AT MEDICINE

Editor's Note. In this section the JOURNAL *reproduces editorials relating to medicine which have appeared in the lay press. An effort is made to include both favorable and unfavorable comments, and the Editorial Board in no instance assumes responsibility for the opinions expressed.*

Kansans May Be Proud of Medical Center

Every individual is prone to discuss his personal health problems more than he should. And every newspaper editor is equally given to drawing on his own personal experiences for his subject material.

We have no desire or intention to burden readers with the former, but we do believe we have something to say along the latter line which might be profitable for any Kansan to know. It stems from a first look at a fine state institution—the Kansas University Medical Center at Kansas City, Kansas.

Down through the years we have had many occasions to report the trips of others to the Medical Center and to hear, read and write of it often, but all without knowing, first hand, what a fabulous place it is. Now, after being there briefly, we feel impelled to say that all Kansans should not only feel proud to have such an establishment in their state but downright fortunate, for it ranks among the best and finest in the nation.

Not only is the physical plant a credit to Kansas but the entire atmosphere is one of friendly helpfulness. This would not be surprising from an institution run by a church or some other private agency. For one owned and operated by a governmental unit we think it is. The former would have more reason and better opportunity to "ride herd" on the personnel, it might appear. But in this case it is the State of Kansas and the Kansas University which have somehow managed to do a tremendous job of building a great institution and making of it a leading health center in every respect.

We cannot, of course, affirm that every man connected with the establishment is above reproach, but there is good reason to believe that the great majority of them are. And if one has confidence in his local physician he may easily be directed into good and capable hands when he becomes in need of a specialist.

In our particular instance two personal friends (Dr. George Gill and Dr. Harold Patterson) led us directly to the head of the neuro-surgical department, Dr. William P. Williamson. "If he can't pinpoint the trouble, nobody can," they said, "but he certainly won't mislead you."

Naturally the direction sounded quite awesome, for the broad field of neurology includes such things as strait jackets and brain surgery. Actually, there are myriad angles with purely physical causes and medical approaches. To our great relief (and perhaps to the surprise of some of our friends) ours proved to be one of the latter and it took less than an hour to determine. But had it been more it still would have been reassuring to know that the procedure was not ill-advised.

The entire point is that whether you are guided to your state medical center by friends or by someone else in whom you have confidence, you will be very likely to find every reason to be glad you are a Kansan, with an establishment like the Kansas University Medical Center close at hand, at your service.—*Lyons Daily News, January 31, 1959.*

Our City and the Doctors

The current issue of a national picture magazine has a story designed to set the reader on his ear and perhaps drum up a little extra circulation. It is supposed to expose the operations of hospitals, and one sentence announced that hospitals are run for the convenience of doctors and nurses and not for the benefit of patients.

The medical profession has made an excellent target in the last decade for groups as well as individuals. Everyone likes his family doctor but among these admirers are those who turn on the profession at large. Doctors make excellent targets because they are type shy. They avoid publicity. It has to do with some old-fashioned code of ethics that should have been junked when smallpox vaccine was discovered. Even when doctors have their worst critic under the knife they refuse to poke around in his giblets and give him what he has coming to him. Consequently the doc is held in high esteem when pain tears through the gizzard, but when the patient is hitting on all six cylinders and his spark plugs are clean he sees the doctor as a fellow who rakes in the cash so fast he needs a hay barn to store it. Furthermore, the medical man contributes nothing to community or the public's general welfare, in the eyes of the critic.

This week the Arkansas City Academy of Medicine announced three scholarships would be given to local school teachers for postgraduate work. The purpose of these scholarships is to improve the educational system here. But the doctors do more than this for the community at large and especially for young people from all walks of life.

The staff at Memorial Hospital has sponsored train-

ing for nurses. In fact five have benefited. Another was sponsored for x-ray training at Wichita. In addition four have received $300 scholarships to learn.

There are numerous time-consuming gratuities for which the local doctors get little credit. They offer free physical examinations to girl scouts when they go to camp. The school athletes get free examinations and a doctor sits with the team at football games.

At Christmas time the hospital employes are sponsored by the doctors. Doctors sponsor paid advertisement to help the Red Cross get blood which replaced blood used by the staff. They will do the same thing to encourage people to get polio shots.

Doctors have sponsored the hospital float in the Arkalalah parade. They gave $500 toward the air conditioning fund. The same amount went to the Udall disaster fund and the United Fund received $275 from the doctors. Last summer the Youth Recreation program was supported by a $500 contribution from the doctors.

Presently the medical men are working toward establishing courses at the Junior college for students interested in x-ray and laboratory work. They would sponsor one laboratory and one x-ray technician each year. A dictating system for the hospital is another of their projects.

There has been no lack of interest in community affairs either on the part of the medical doctors. Two serve on the school board and several have been active in the Chamber of Commerce through the years.

The foregoing information possibly reveals to the people some things they didn't know, and perhaps it would have been unethical to treat each fact as a separate news story. It is obvious, however, that the medical profession has done well by the community when one considers the doctors individually or as a group. While the citizen reserves the right to criticize he should also ask himself if he and his organization have done as well.—*Arkansas City Traveler, January 30, 1959.*

Packet for Medical Emergencies

U. S. Army Medical Service supply officers recently demonstrated an emergency medical packet for use in a mass casualty situation to representatives of the Office of the Assistant Secretary of Defense (Health and Medical), the Navy's Bureau of Medicine and Surgery, and the Air Force Surgeon General.

Mass casualty situations occur whenever the number of persons injured is out of proportion to the medical resources available. The problems of mass casualty care are thus not confined to nuclear warfare, but can result from fires, floods, hurricanes, and other civil disasters.

The new medical packet—called Phase I Emergency Medical Treatment Unit—is designed to meet conditions immediately following a military disaster. It has been assumed that during this period no direct professional medical help may be expected, and casualties will either treat themselves or be cared for by other non-medical personnel. Containing 23 items, the emergency packet will provide medical material for treatment of approximately 100 casualties for about 72 hours.

This packet is, however, designed for much more than first aid. The items included have been carefully selected, and training in their use will be carried out by all three services.

Representatives of the Assistant Secretary of Defense (Health and Medical) and a professional supply representative from each of the military departments selected the items to be included, and the emergency care packet was developed at the tri-service Medical Equipment Development Laboratory, Fort Totten, New York, and at the Army Medical Supply Depot, Louisville, Kentucky.

Packaged as one unit, the emergency care packet has nine component cartons: two master packs containing Dextran and miscellaneous items, one fracture pack, two burn packs, and four wound packs. The packages contain 23 items and sufficient medical material to provide care for 100 casualties for 72 hours.

In developing the packet a number of guidelines were followed to assure that the container would be light and inexpensive; easily distinguished from all other material either by use of color or symbol; of weight and bulk to permit handling and transport by individuals; and that the single load could be sealed in such a way as to give visible evidence of inadvertent or malicious opening.

Markings on the outer container include the assembly stock number, nomenclature, weight and cube, the level of packing, month and year assembled, caution information, and control serial number.

A.M.A. Editor Resigns

Dr. Austin Smith announced his resignation last month as editor of the *Journal of the American Medical Association.*

Dr. F. J. L. Blasingame, executive vice president of the A.M.A., said that Dr. J. F. Hammond, associate editor of the *Journal,* will take over Dr. Smith's duties.

Dr. Smith has served as editor of the *Journal* since 1949. He succeeded Dr. Morris Fishbein. In addition to being editor of the *Journal,* he also has directed editorial policies of the association's nine monthly specialty journals. The *A.M.A. Journal,* published weekly, exceeds 175,000 circulation.

PHYSICIANS' ACTIVITIES

Dr. Marshall A. Brewer, Ulysses, was speaker at a recent meeting of the Rotary Club there. He discussed mental illness and its treatment.

"The Fifth Dimension" was the subject chosen by **Dr. Thomas P. Butcher,** Emporia, for an address before the Rotary Club in Kansas City on February 10.

Dr. Charles M. Poser, assistant professor of neurology at the University of Kansas School of Medicine, has been elected to membership in the Societe Belge de Neurology and has been made a fellow of the American Academy of Neurology.

Dr. Alfred M. Tocker, Wichita, presented a paper before the Singleton Surgical Society in Mexico City on January 17. The subject was "Selective Pulmonary High Carcinolytic Agent Concentration in the Treatment of Bronchogenic Carcinoma—A Preliminary Experimental Report." Associate authors were **David Givner, M.D.;** LeRoy E. Dietrich, Jr., D.V.M.; Charles Schnitzler, D.V.M., and **William J. Reals, M.D.**

Dr. Paul J. Uhlig, a pediatric resident at the University of Kansas School of Medicine, recipient of a Wyeth Laboratories Pediatric Residency Fellowship, recently toured Wyeth's Institute for Medical Research and Wyeth's Antibiotic Laboratories in Pennsylvania.

A paper by **Dr. Henry M. Foster,** Hays, was published in the January issue of *American Journal of Obstetrics and Gynecology.* Title of the paper was "Clinical Manifestations of Hypometabolism in Women."

Dr. James W. Neumann, Garden City, presented a film on the heart at a congress on agriculture presented February 18 and 19 by the Garden City Chamber of Commerce.

Dr. Ralph H. Major, of the University of Kansas Medical Center, has been notified that his textbook on physical diagnosis has been translated into Persian by Dr. Kazem Motiey of the University of Tehran Medical College, Iran.

Plans to move to Oklahoma City have been announced by **Dr. Walter E. Blevins,** who has been practicing in Liberal and Satanta.

Commissioners in Ellsworth County have announced appointment of **Dr. Frank A. Dlabal,** Wilson, as health officer.

Dr. F. Russell Frink, Lawrence, has announced that **Dr. Robert D. Hughes** is now associated with him in practice. Dr. Hughes completed a general practice residency at the University of Kansas Medical Center in mid-February.

"Health and Safety" was the subject discussed by **Dr. Henry K. Baker** at a meeting of the Business and Professional Women's Club in Chanute last month.

Dr. Donald Greaves, chairman of the Department of Psychiatry at the University of Kansas Medical Center, was speaker at a meeting sponsored by the Woman's Auxiliary to the Wyandotte County Medical Society on February 3. The occasion was the organization's annual guest day.

Hypnotism was the subject chosen by **Dr. Philip A. Godwin,** Lawrence, for a talk before the Lawrence Kiwanis Club recently.

Dr. Norton L. Francis, president of the Sedgwick County Medical Society, addressed the Sedgwick County Medical Assistants' Society at a meeting in Wichita on January 21.

President Eisenhower has nominated **Dr. Franklin D. Murphy,** chancellor of the University of Kansas, for a new three-year term as a member of the U. S. Advisory Commission on Educational Exchange. The nomination was confirmed by the Senate on February 19.

Dr. John K. Fulton, Wichita, spoke on "Pulmonary Functions" at a recent meeting of the South Central District of the Kansas Society of Medical Technologists. The meeting was held in Wichita.

Dr. Marion F. Russell spoke to the Rotary Club in his home city of Great Bend recently on the part physicians have played in developing Barton County.

The Snyder Clinic, Winfield, announces the association of **Dr. Mildred R. Passmore** and **Dr. Margaret B. Obenschain** in its department of pediatrics.

Dr. Glen E. Kassebaum, El Dorado, showed colored slides taken during a trip to Europe at a recent meeting of the Butler County Medical Assistants' Society in El Dorado.

Dr. K. R. Reissmann, of the University of Kansas Medical Center, has received a grant from the American Heart Association for a study of "Quantitative Relationship of Tissue Hypoxia and Cellular Impairment," to cover a period from January 1, 1959, through December 31, 1960.

In a list of 20 appointments made by Governor George Docking recently, subject to confirmation by the Senate during the 1959 session, were two nominations for the Kansas State Board of Health, **Dr. James J. Basham** of Fort Scott and **Dr. Earl C. Sifers** of Kansas City.

Dr. Ward M. Cole, Wellington, participated in a forum launching Parent-Teacher Association study groups in Wellington last month. Four areas of family life were discussed, and Dr. Cole spoke on home influence and authority.

Dr. E. Grey Dimond, of the University of Kansas Medical Center, spoke on "Experience with Internal Mammary Artery Ligation for Angina Pectoris" at a recent meeting of the Buchanan County (Missouri) Medical Society.

Dr. Leland F. Glaser of Hutchinson and **Dr. Lewis G. Allen** and **Dr. Doris Kubin** of Kansas City were elected to fellowship in the American College of Radiology at a meeting held in Chicago last month.

Dr. Francis R. Applegate, formerly of St. Marys, moved to Goodland last month and began practice there on February 15. He was graduated from the University of Kansas School of Medicine in 1955.

"A Case Study on Diabetic Acidosis and Coma" was presented at a meeting of the Graham County Registered Nurses Association recently by **Dr. Donald L. Marchbanks** of Hill City.

COUNTY SOCIETIES

A meeting of the Douglas County Medical Society was held at Lawrence on January 20. Dr. Kenneth E. Jochim, chairman of the Department of Physiology at the University of Kansas, spoke on "Cardiovascular Responses to Epinephrine."

Mr. James K. Logan, assistant professor of law at the University of Kansas, was guest speaker at a meeting of the Shawnee County Medical Society held in Topeka on February 2. His subject was "Estate Planning."

"Treatment of Acute Renal Failure" was the subject discussed by Dr. Belding H. Scribner, of the University of Washington School of Medicine, at a meeting of the Sedgwick County Medical Society held in Wichita on February 9.

Dr. Thomas P. Butcher, Emporia, president of the Kansas Medical Society, presented 50-year diamond lapel pins to five physicians who are members of the Tri-County Medical Society at a meeting held at Harper on January 28. The five so recognized are: Dr. Harry L. Cobean, Dr. Albert R. Hatcher, and Dr. William H. Neel, all of Wellington, Dr. David E. Kisecker of Caldwell, and Dr. George M. Wooden of Argonia.

Evaluation of Mitomycin C

The Cancer Chemotherapy National Service Center reported today that Mitomycin C, an antibiotic reported as giving promising results in cancer treatment in Japan, his frequently produced major toxic reactions but seldom objective improvement in clinical trials in the United States.

The antibiotic has been under pilot clinical evaluation in this country as an anti-tumor agent in a substantial variety of tumors. In view of the effects observed in three current studies, it has not so far replaced the standard chemotherapeutic agents in any form of cancer, the Chemotherapy Center's announcement said. Full reports on the clinical trials will appear later in the scientific literature. Meanwhile, studies of the drug are being continued.

Japanese experience in treating human cancer with Mitomycin C was reported at a Symposium on Antibiotics in Washington, D. C., October 16, 1958.

BOOK REVIEWS

Essentials of Therapeutic Nutrition. By Solomon Grab, M.D. Published by Springer Publishing Company, Inc., New York. 147 pages. Price $2.00, Paperback.

The aim of this book is to give the graduate nurse a patient-centered review of therapeutic nutrition. The book is divided into three parts: The Principles of Nutrition, Therapeutic Diets, and Quick Reference Tables.

In the first part the basic principles of nutrition are discussed in a clear and condensed manner.

The second part is composed of therapeutic diets commonly used in the treatment and prevention of disease. Each diet outlines the purpose, analysis, deficiencies, food to be increased, decreased or omitted, and comments concerning diet. Information regarding these diets was collected from a survey of diets used in several large hospitals of the United States.

The last part contains quick reference tables. These tables would be of more value if all gave the household measurement of 100 grams of food. Most people have difficulty in visualizing the amount of food weighing 100 grams. Example: 100 grams of meat and 100 grams of head lettuce.

I believe the graduate nurse in a situation requiring her to give diet instructions or to answer dietary questions would find this book to be a good review of therapeutic nutrition.—*V.G.H.*

Treatment in Internal Medicine. By Harold Thomas Hyman, M.D. Published by J. B. Lippincott Company, Philadelphia. 609 pages. Price $12.50

This book is extremely useful as a quick reference for diagnosis and treatment of diseases a physician sees in his daily office practice. It is organized in ten sections:

1. The Infectious Diseases
2. Metabolic Disturbances
3. Neoplasms
4. Allergies, Collagen Disorders, Hypersensitivities, Idiosyncrasies, and Untoward Reactions
5. Poisonings and Environmental Hazards
6. Disturbances of the Circulatory System
7. Disturbances of Blood and Blood-forming Organs
8. Neuropsychiatric Disturbances
9. Disturbances of the Endocrine Glands
10. Disturbances in Specialty Fields

The diagnosis of each disease is described, then the most effective form of treatment, then alternate forms of treatment with advantages and disadvantages of each.

Especially worthwhile are the lists of anti-infective agents with indications for clinical use of each product, virus diseases, metabolic disturbances, allergic disturbances, collagen disorders, and many others.—*G.W.N.*

Dorland's Pocket Medical Dictionary. 20th Edition. Abridged from Dorland's Illustrated Medical Dictionary. Published by W. B. Saunders Company, Philadelphia. Price $4.50.

Since 1898 the medical profession has had access to an abridged (pocket) version of Dorland's standard work. The 20th edition, out last month, is the first published since the death of Dr. W. A. Newman Dorland in September of 1956.

The volume differs little from previous issues in general appearance or format; the only changes of importance are in content. As knowledge of medicine and related sciences increases, words are added, deleted, and changed in meaning. The physician who is interested in precise terminology finds a new dictionary a necessity at regular intervals.

The three primary functions of a dictionary—the provision of spelling, pronunciation, and meaning—are fulfilled in this pocket volume. While it does not take the place of a larger dictionary, it efficiently serves the purpose for which it was intended.—*P.F.*

Disease and Destiny—Logan Clendening. By Ralph H. Major, M.D., Eighth Series of Logan Clendening Lectures on the History and Philosophy of Medicine. University of Kansas Press, Lawrence. 49 pages, 7 figures. Price $2.00.

This is a printing of two addresses given for a memorial lectureship in honor of the late Doctor Clendening. They are entirely unrelated and are combined apparently because they were given in the same year. The author is a retired professor of medicine of the University of Kansas, who was familiar with Doctor Clendening and shared his interests in medical history. The second lecture is devoted to a sketch of his life with particular emphasis on his activities in developing a Department of the History of Medicine at Kansas. It contains many quotations and anecdotes, rather loosely assembled, and reads like a eulogy.

The first lecture cites a number of examples where disease apparently played a part in shaping the course of history, either by affecting the lives of strategic individuals, or undermining the strength

of populations or nations. The instances cited are described at considerable length, but the conclusion reached is only that disease plays a role in history.

The original audiences no doubt enjoyed these talks. One wonders, though, if the material presented was worth publishing, and how many people will pay $2.00 to read it.—*J.E.S.*

The Birth of Normal Babies. By Lyon P. Strean, Ph.D. Published by Twayne Publishers, New York City, 193 pages. Price $3.95.

This book concerns itself with probable causes and theories of pregnancies that end in failure; that is, in miscarriages, birth defects in the newborn, or stillbirth. According to Dr. Strean, the major causes of defective babies can be attributed to the occurrence of stress in one form or another during the first three months of pregnancy. The stress may result from a fall, a blow, powerful medicines, antibiotics, infectious diseases, or possibly even unhappy and unpleasant environmental situations. It is his feeling that these conditions give rise to an excess output of cortisone, which is apparently the direct cause of the various abnormalities. He states that since Vitamin B_6 counteracts the effects of cortisone, it should be included in adequate amounts in every prenatal diet.

Dr. Strean arrived at his conclusions after investigating the prenatal experiences of mothers of approximately 200 babies with cleft palate. In all of these instances he found at least some evidence of emotional strain, injury, or some illness in the first three months of the prenatal period. Many of the traumatic experiences that he describes, however, are no different than many patients experience during this period of the prenatal life. At no time did Dr. Strean investigate experiences of normal prenatal patients, and his conclusion, I am sure, indicates his inexperience with their usual symptoms.

Dr. Strean also lists many case histories to substantiate his beliefs. At best one might say that he has some interesting ideas concerning causes of fetal injuries, and the future may even prove that he is right. However, the experimental evidence that he lists in his book is entirely inadequate for the conclusions that he draws.—*R.G.H.*

Nursing Recruits Reach New Total

Admissions to schools of professional and practical nursing reached a new high in 1958, according to the Committee on Careers, National League for Nursing, New York. An estimated 46,600 students entered basic professional nursing schools, compared with 44,281 the preceding year. Some 20,000 began training for careers in practical nursing, compared with 16,710 the year earlier.

John H. Hayes, chairman of the committee, which spearheads national information activities for careers in nursing, points out that these admissions records for nursing schools indicate several factors may be operating to help ease personnel shortages in nursing. These are a slight population increase in the teenage group eligible for professional nursing, an increasing number of schools of practical nursing, and the growing effectiveness of community nursing information programs throughout the country.

Among professional nursing schools, diploma nursing programs in hospitals and independent schools showed the largest numerical new student gain, rising from 36,318 in 1957 to 38,550 in 1958. These programs accounted for 82.7 per cent of the new nursing students in both years. Basic college programs leading to a bachelor's degree in nursing rose in admissions from 6,893 to 7,250, or 15.6 per cent of the total admissions in each year. The newer junior and community college nursing program, usually two years in length, showed a slight gain from 770 to 800 new students or 1.7 per cent of each year's total admissions.

Nursing education programs accredited nationally by the National League for Nursing continued in 1958, as in several years past, to attract the large majority of new students, 82 per cent of those entering schools reporting in the survey going into fully or provisionally accredited programs.

Admissions estimated for professional schools are for the calendar year 1958, for practical nursing schools for the academic year 1957-58. The 1958 figures are estimated by projecting returns from the majority of schools to the total number of schools. The 1957 figures are actual admissions.

The Committee on Careers is jointly sponsored by the American Hospital Association, American Medical Association, American Nurses' Association, and the National League for Nursing, and its program is supported also by the Sealantic Fund and the National Foundation.

Duane G. Wenzel, Ph.D., professor of pharmacology at the University of Kansas, has received a grant from the Tobacco Industry Research Committee for a study of "The Determination of the Chronic Effects of Orally Administered Nicotine on Serum Cholesterol and Phospholipids; the Electrocardiographic Response to Ergonovine, and the Vascular Pathology of Cholesterol-Fed Rabbits." New appropriations of the committee bring to $3,200,000 the amount provided by the industry group for research.

Children and Poison Don't Mix

Fifteen hundred children will die from accidental poisoning this year, according to a newsletter published recently by the Medical Department of Ross Laboratories, Columbus, Ohio. A child is exposed to many potential perils from medicines, insecticides, insect repellents, bleaching solutions, and cleaning and disinfecting substances.

Poisoning is frequently the result of exposure to toxic agents in *unsafe places* in the home. As children become more mobile, they climb to higher places such as medicine cabinets, upper shelves and other storage areas, and frequently become victims of poisoning by drugs intended for internal administration. A basic rule for prevention is that all potentially harmful substances should be placed in places completely inaccessible to the infant or small child. Prevention is the best therapeutic measure available.

Storing harmful substances in household containers is a contributory cause of poisoning in far too many cases. Kerosene, benzene, turpentine, ammonia, furniture polish, and insecticides are frequently stored in such containers as drinking glasses, soda bottles, mayonnaise jars, coffee cans, milk bottles, and fruit jars. In more than 50 per cent of reported cases in which poisoning was due to bleaching agents, solvents, ammonia, and insecticides, the substances were not in their original containers when the poisoning occurred.

Study also indicated that in addition to not being in their original containers, most of the toxic agents were in open places, such as tables, shelves, floors, under sinks, or on window sills. In many other cases, the toxic agent was in a handbag given to the child to play with. If these substances had been kept in their original containers and placed in out-of-the-way areas, inaccessible to the child, the occurrence of poisoning would have been eliminated.

Other children and adults who may be alert to the dangers of poisons may, through force of habit in using particular containers, ingest the substances by accident. The best advice for the whole family is never to put poison in any familiar container.

If parents realize the potential harm of substances in the home, and utilize ordinary safety precautions in making sure that toxic materials are out of reach of their children, accidental poisonings will be minimized.

Mouth-to-Mouth Resuscitation

"And he (Elisha) went up, and lay upon the child, and put his mouth upon his mouth, and his eyes upon his eyes, and his hands upon his hands: and he stretched himself upon the child; and the flesh of the child waxed warm." II Kings 4:34

A recent revival of the Bible method of helping asphyxiated patients to breathe again is being used by the Army Medical Service.

Called "mouth-to-mouth" resuscitation and believed to be "the best system available," the method is now being taught at Brooke Army Medical Center, Fort Sam Houston, Texas, to all personnel at the Army Medical Service school, including assigned instructors and administrative personnel, demonstration troops, and students, whether officers or enlisted men or women.

The process is new in recognition only, for, apart from the story of Elisha, medical history recorded successful resuscitation by mouth-to-mouth breathing more than 200 years ago. Studies conducted during the past few years have proved the superiority of this procedure in comparison with other methods of artificial respiration in common use.

In its simplest form, the operator removes any mucus or foreign matter from the victim's throat and mouth, with his fingers. He then takes a firm hold on the patient's lower jaw, tilts the head back by pulling on the jaw, pinches the patient's nostrils shut, and after taking a breath places his mouth over the patient's mouth and exhales until he sees the chest of the patient lift. The operator then takes his next breath while listening for the patient's exhalation. The operator breathes about 12 times a minute for adults, and about 20 times a minute for children.

Advantages of the process are many. Mouth-to-mouth resuscitation forces more air into the patient's lungs; it is more easily controlled by the operator; the operator can continue for a long period of time with no ill effects; it is effective with any asphyxiated patient; no equipment is needed for maximum results, but if equipment is available, it allows greater freedom of motion for attendants.

Contrary to popular belief, exhaled air is not entirely carbon dioxide, but contains enough oxygen to revive the patient with no harmful effects from carbon dioxide. In addition, laboratory tests have proved that the volume of air displaced by this method is several times greater than that by any other system of artificial respiration.

Prevalence of Epilepsy

At least one out of every 200 Americans has epilepsy in "mild or severe form," according to the current issue of *Patterns of Disease,* prepared by Parke, Davis and Company for the medical profession.

The disease is cited as "a major health problem," occurring as often as diabetes or active tuberculosis and four times more often than polio.

Further, about six in 100 Americans have "some sort of convulsive episode at some time in their lives."

The Kansas Medical Society—1958-1959

OFFICERS

President	Thomas P. Butcher, Emporia
President-Elect	Glenn R. Peters, Kansas City
Immediate Past President	Barrett A. Nelson, Manhattan
First Vice-President	F. E. Wrightman, Sabetha
Second Vice-President	Harold M. Glover, Newton
Secretary	George E. Burket, Jr., Kingman
Treasurer	John L. Lattimore, Topeka
A.M.A. Delegate, 1958-1959	George F. Gsell, Wichita
A.M.A. Alternate, 1958-1959	Cyril V. Black, Pratt
A.M.A. Delegate, 1959-1960	Lucien R. Pyle, Topeka
A.M.A. Alternate, 1959-1960	Norton L. Francis, Wichita
Chairman of Editorial Board	Orville R. Clark, Topeka

COUNCILORS

District 1	Emerson D. Yoder, Denton
District 2	J. W. Manley, Kansas City
District 3	George R. Maser, Mission
District 4	Dick B. McKee, Pittsburg
District 5	Ralph G. Ball, Manhattan
District 6	James A. McClure, Topeka
District 7	Edward J. Ryan, Emporia
District 8	James E. Hill, Arkansas City
District 9	L. S. Nelson, Jr., Salina
District 10	John N. Blank, Hutchinson
District 11	William J. Reals, Wichita
District 12	Albert C. Hatcher, Wellington
District 13	Henry S. O'Donnell, Ellsworth
District 14	Justin A. Blount, Larned
District 15	Lyle G. Glenn, Protection
District 16	Edward F. Steichen, Lenora
District 17	H. Preston Palmer, Scott City

OFFICERS OF COMPONENT SOCIETIES—1959

Society	*President*	*Secretary*
Allen	Eugene Myers, Iola	L. D. Robinson, Iola
Anderson	Robert L. Stevens, Garnett	Mildred J. Stevens, Garnett
Atchison	G. A. Patton, Atchison	Wayne O. Wallace, Atchison
Barton	Clair Cavanaugh, Great Bend	David G. Shivel, Great Bend
Bourbon	L. L. Cooper, Fort Scott	James Basham, Fort Scott
Brown	Ray Meidinger, Hiawatha	R. T. Nichols, Hiawatha
Butler	J. H. Johnson, El Dorado	Dale W. Anderson, Augusta
Central Kansas	Rex Belisle, Hays	Glen C. Hutchison, Hays
Chase		Jacob Hinden, Strong City
Chautauqua	Ivan E. Lloyd, Sedan	William K. Walker, Sedan
Cherokee	Charles S. Davis, Galena	Richard H. Claiborne, Baxter Springs
Clay	R. B. McVay, Clay Center	F. C. Shepard, Clay Center
Cloud	W. L. Fowler, Concordia	A. L. Duell, Concordia
Coffey	A. B. McConnell, Burlington	
Cowley	Bruce G. Smith, Arkansas City	C. J. Zerwick, Arkansas City
Crawford	G. W. Pogson, Pittsburg	John G. Esch, Pittsburg
Dickinson	A. W. Butcher, Abilene	G. C. Steinberger, Abilene
Doniphan	Emerson D. Yoder, Denton	Robert L. Corder, Highland
Douglas	Glenn A. Lessenden, Lawrence	M. Erik Wright, Lawrence
Edwards		F. G. Meckfessel, Lewis
Elk		J. Gordon Claypool, Howard
Finney		H. M. Wiley, Garden City
Ford	G. H. Jackman, Cimarron	E. W. Schwartz, Dodge City
Franklin	J. F. Barr, Ottawa	David G. Laury, Ottawa
Geary		R. M. Carr, Junction City
Greenwood	John H. Basham, Eureka	Robert L. Obourn, Eureka
Harvey	Frances A. Allen, Newton	Robert P. Stoffer, Halstead
Iroquois	Lyle G. Glenn, Protection	W. W. Orrison, Plains
Jackson		Roy H. Moser, Holton
Jefferson	R. R. Snook, McLouth	J. K. Griffith, Valley Falls
Jewell	C. S. Hershner, Esbon	R. M. Owensby, Mankato
Johnson	A. S. Reece, Gardner	R. E. Delphia, Olathe
Kingman	R. E. Baldridge, Kingman	G. E. Burket, Jr., Kingman
Labette	H. A. Burnett, Parsons	J. M. Baumeister, Parsons
Leavenworth	T. W. Graham, Leavenworth	J. M. Graham, Leavenworth
Lyon	C. R. Hopper, Emporia	C. H. Munger, Emporia
McPherson	V. C. Price, McPherson	Willard Kaufman, Moundridge
Marion	A. K. Ratzlaff, Goessel	R. L. Krause, Goessel
Marshall	D. M. Diefendorf, Waterville	R. M. Thomas, Marysville
Miami	Melvin Masterson, Paola	Robert E. Banks, Paola
Mitchell		J. F. Nienstedt, Beloit
Montgomery	John F. Coyle, Coffeyville	K. R. Grigsby, Coffeyville
Morris		N. A. Burkett, Council Grove
Nemaha	V. E. Brown, Sabetha	R. E. Capsey, Centralia
Neosho		Albert A. Kihm, Chanute
Northwest Kansas	J. R. Neuenschwander, Hoxie	S. Paul Hornung, Norton
Osage		J. L. Ruble, Jr., Overbrook
Osborne	W. W. Miller, Osborne	J. E. Henshall, Osborne
Pawnee	O. R. Cram, Larned	H. L. Patterson, Larned
Pottawatomie		Fred E. Brown, St. Marys
Pratt	F. G. Freeman, Pratt	J. W. Jacks, Pratt
Reno	R. N. Shears, Hutchinson	V. R. Moorman, Hutchinson
Republic	P. L. Beiderwell, Belleville	E. J. Chaney, Belleville
Rice	David H. Rau, Lyons	P. E. Beauchamp, Sterling
Riley	E. D. McNeil, Manhattan	K. M. Boese, Manhattan
Rush-Ness	Kenneth McLain, Ransom	Peter K. Wiens, Ness City
Saline	G. Sherman Ripley, Jr., Salina	C. J. Weber, Salina
Sedgwick	N. L. Francis, Wichita	M. A. Carter, Wichita
Seward		Harold Dittemore, Liberal
Shawnee	C. W. Bowen, Topeka	B. W. Ramsey, Topeka
Smith	R. G. Sheppard, Smith Center	V. E. Watts, Smith Center
South Central Tri-County	L. W. Patzkowsky, Kiowa	Yale E. Parkhurst, Belle Plaine
Stafford	O. W. Longwood, Stafford	C. Everett Brown, Stafford
Washington		L. L. Huntley, Washington
Wilson		C. E. Stevenson, Neodesha
Woodson	A. C. Dingus, Yates Center	H. A. West, Yates Center
Wyandotte	M. R. Fitzpatrick, Kansas City	Wray Enders, Kansas City

ANNOUNCEMENTS

Tenth annual F. G. Thompson, Sr., lecture at Thompson, Brumm, Knepper Clinic and Hospital, St. Joseph, Missouri, Thursday evening, May 21. Speaker, Dr. Michael L. Mason, Northwestern University School of Medicine. Subject, "Treatment of Acute Injuries to the Hand."

Medical officers needed by National Institutes of Health, Army, Navy, Air Force, Public Health Service, Indian Service Hospitals, Food and Drug Administration, the Children's Bureau, and St. Elizabeth's Hospital, Washington, D. C. Starting salaries from $7,510 to $12,770. Write U. S. Civil Service Commission, Washington 25, D. C., asking for Announcement No. 178.

Oregon Cancer Conference, Portland, July 16 and 17. Programs and hotel reservation forms available from Roscoe K. Miller, Oregon State Medical Society, 1115 S.W. Taylor Street, Portland 5, Oregon.

Seventh annual interim scientific meeting, Phi Lambda Kappa, Deauville Hotel, Miami Beach, Florida, April 5-12. Write Dr. Samuel L. Lemel, 1621 Euclid Avenue, Cleveland 14, Ohio.

Sixteenth annual meeting, Association of American Physicians and Surgeons, Fort Worth, Texas, April 2-4. Write the Association, 185 North Wabash Avenue, Chicago 1, Illinois.

Thirteenth annual Rocky Mountain Cancer Conference, Denver, July 22-23. Block of rooms reserved at Brown Palace Hotel. Write John W. Pompelli, Colorado State Medical Society, 835 Republic Building, Denver 2, Colorado.

Silver anniversary meeting, American College of Chest Physicians, Ambassador Hotel, Atlantic City, June 3-7. Examinations for fellowship on June 4. Write the College, 112 East Chestnut Street, Chicago 11, Illinois.

Deadline for receipt of new and reopened applications for certification by American Board of Obstetrics and Gynecology, August 1. Write Dr. Robert L. Faulkner, 2105 Adelbert Road, Cleveland 6, Ohio.

Series of refresher courses during May and June at Children's Hospital, Philadelphia, and Graduate School of Medicine, University of Pennsylvania. Courses include pediatric advances, pediatric hematology, practical pediatrics. Write Dr. Irving J. Wolman, 1740 Bainbridge Street, Philadelphia 46, Pennsylvania.

Summer School of Alcohol Studies of Laboratory of Applied Biodynamics, Yale University, June 28-July 23. Write Registrar, Yale University, 52 Hillhouse Avenue, Yale Station, New Haven, Connecticut.

Meeting, American Goiter Association, Drake Hotel, Chicago, April 30-May 2. Write Dr. John C. McClintock, 149½ Washington Avenue, Albany 10, New York.

First Midwestern Sectional Meeting, Biological Photographic Association, University of Iowa, April 24-26. Write Carroll H. Weiss, 160 Riverside Drive, New York 24, New York.

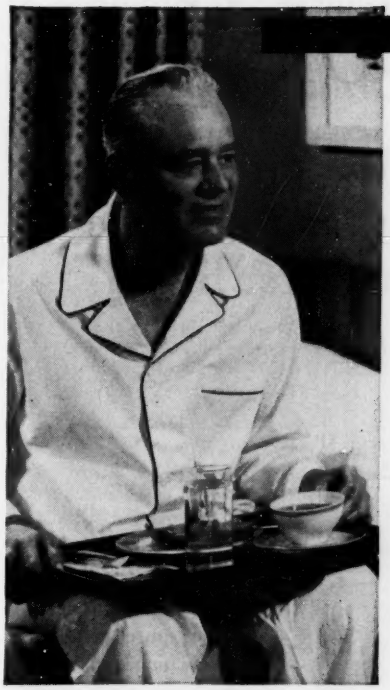
Pan-Pacific Surgical Association, Honolulu, Hawaii, September 28-October 5, 1960. Write Dr. F. J. Pinkerton, Suite 230, Alexander Young Building, Honolulu 13, Hawaii.

Nine-month traineeship in cardiology for the practicing physician, Cardiovascular Laboratories, University of Kansas Medical Center, Kansas City, September 15, 1959-June 15, 1960. Formal instruction and practical experience in diagnosis and therapy. Enrollment limited. Tuition $600. Write Department of Postgraduate Medical Education, KUMC, Kansas City 12, Kansas.

Bibliography of Aviation Medicine Available

The Aero Medical Association, in cooperation with the Library of Congress, has completed arrangements to publish a comprehensive annotated bibliography of aviation medical literature for 1953, according to an announcement by Brigadier General M. S. White, USAF (MC), Washington, D. C., president of the society. The volume will be off the press in January 1959.

Entitled, *Aviation Medicine: An Annotated Bibliography, Vol. II (1953 Literature)*, the work includes 1,386 references and abstracts from nearly 200 American and foreign journals. Subsequent annual volumes will contain published reports from the literature of 1954 to the present.



IN DEBILITATING DISEASE

Patients receiving

NILEVAR®

Eat more...
Feel better...
Recover faster

Compared to control patients, those receiving Nilevar (brand of norethandrolone) have repeatedly demonstrated more rapid and more complete recovery from serious acute illness and increased comfort and well-being in chronic illness.

A multitude of case histories are now adding individual clinical color to the earlier controlled investigations which defined the actions of Nilevar as an effective aid in reversing negative nitrogen balance and in building protein tissue.

In typical case reports such gratifying comments as these appear:

Underweight —"Appetite considerably increased within one week. Sense of well-being and vigor increased along with increased appetite."

Prematurity (Birth weight: 2 pounds, 4 ounces) — "Gradual improvement in appetite and capacity for formula. . . . Excellent progress and weight gain for a very immature infant."

Carcinoma of the Uterus —"Within four days appetite became excellent, took full diet. . . . More ambition while on Nilevar. Enjoys life. Takes part in church and other social affairs."

Third Degree Burn—". . . soon began eating all that was offered. . . . Began to show signs of hope for recovery. . . . Perhaps one of the greatest changes was in the appearance of his wounds which were so very much improved."

The dosage for adults is 20 to 30 mg. daily in single courses no longer than three months. For children the daily dosage is 0.5 mg. per kilogram of body weight, in single courses no longer than three months.

Nilevar is supplied in tablets of 10 mg., ampuls of 25 mg. (1 cc.) and Nilevar Drops of 0.25 mg. per drop.

G. D. Searle & Co., Chicago 80, Illinois. Research in the Service of Medicine.

SEARLE

The Story of Kent

How Lorillard research produced a cigarette with less tars and nicotine than any other leading filter brand

A major research foundation, under Lorillard sponsorship, determined that the average puff of cigarette smoke contained over 12 billion semi-solid particles. Further research revealed that inhaled smoke from ordinary cigarettes has a predominant proportion of particles, from 0.1 to 1 micron in diameter, average 0.6 micron.

Ordinary filter fibers are so large that they create spaces through which the small semi-solid smoke particle can easily pass. However, in the superior Kent filter, the fibers are mechanically manipulated in such a manner as to create extremely tortuous passageways for the smoke. This is the "MICRONITE" Filter.

The Kent filter is composed of pure cellulose acetate, which is common to the filters used in all leading brands. However, the physical construction of the Kent filter is the exclusive development of Lorillard research, and is different from and superior to all the rest.

Thus, Lorillard research created a filter of ideal purity, with extraordinary ability to eliminate smoke particles... and at the same time, a cigarette of such fine taste that during the past twelve months more smokers changed to Kent than to any other cigarette in America.

Of all leading filter cigarettes

KENT FILTERS BEST

You get less tars and nicotine in the smoke of Kent than in any other leading filter cigarette in America

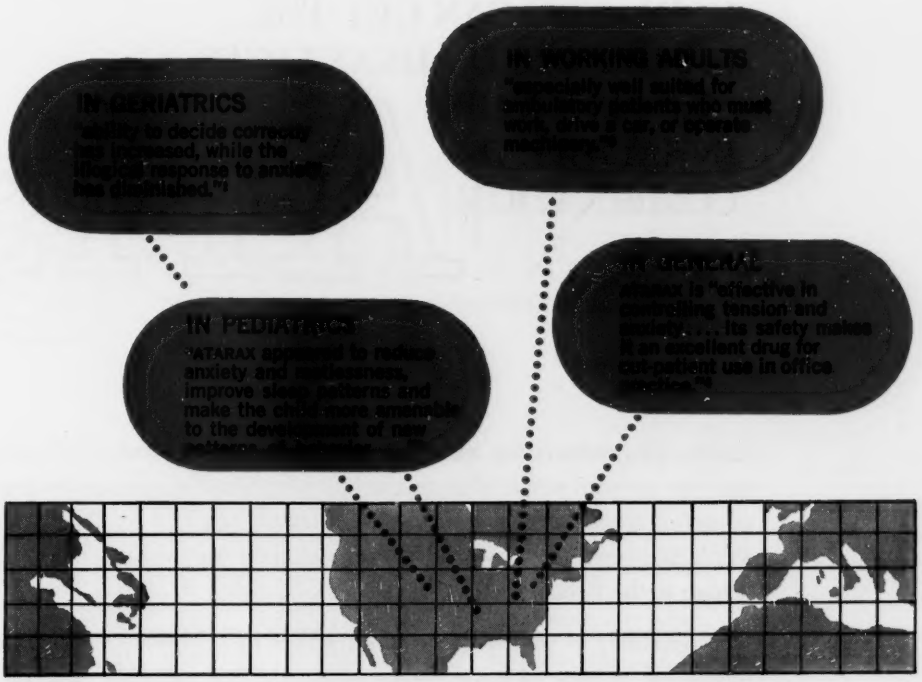
If you would like for your own use the booklet, "The Story of Kent," write to:

P. Lorillard Company, Research Department
200 East 42nd St., N.Y. 17, N.Y.

re-evaluating tranquilizers?

READ WHAT CLINICIANS ARE NOW SAYING ABOUT ATARAX®

(brand of hydroxyzine)



INVESTIGATORS AGREE ON OPTIMAL ATARAX DOSAGES

For childhood behavior disorders	10 mg. tablets Syrup	3-6 years, one tablet t.i.d. over 6 years, two tablets t.i.d. 3-6 years, one tsp. t.i.d. over 6 years, two tsp. t.i.d.
For adult tension and anxiety	25 mg. tablets Syrup	one tablet q.i.d. one tbsp. q.i.d.
For severe emotional disturbances	100 mg. tablets	one tablet t.i.d.
For adult psychiatric and emotional emergencies	Parenteral Solution	25-50 mg. (1-2 cc.) intramuscularly, 3-4 times daily, at 4-hour intervals. Dosage for children under 12 not established.

Supplied: Tablets, bottles of 100. Syrup, pint bottles. Parenteral Solution, 10 cc. multiple-dose vials.

References: 1. Smigel, J. O., et al.: J. Am. Ger. Soc., in press. 2. Freedman, A. M.: Pediat. Clin. North America 5:573 (Aug.) 1958. 3. Ayd, F. J., Jr.: New York J. Med. 57:1742 (May 15) 1957. 4. Menger, H. C.: New York J. Med. 58:1684 (May 15) 1958. 5. Coirault, M., et al.: Presse méd. 64:2239 (Dec. 26) 1956. 6. Bayart, J.: Presented at the International Congress of Pediatrics, Copenhagen, Denmark, July 22-27, 1956.

ATARAX®

Rx PFIZER

New York 17, N. Y.
Division, Chas. Pfizer & Co., Inc.
Science for the World's Well-Being

NOW—YOU CAN GET THE UNSURPASSED ADVANTAGES OF ARISTOCORT IN SALICYLATE COMBINATION

Aristo

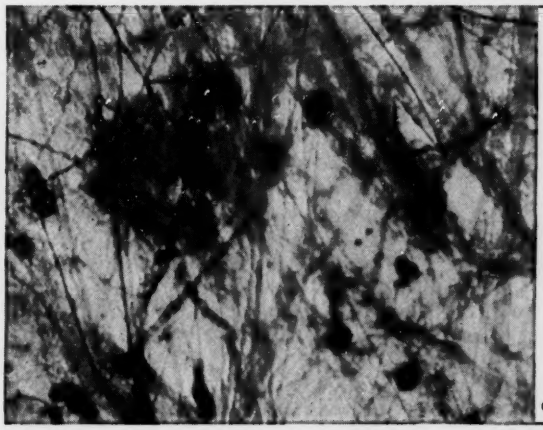
Aristogesic combines the *anti-inflammatory* effects of Aristocort® Triamcinolone with the *analgesic* action of a most potent salicylate. This means that the dosage of each is *substantially lower* than that ordinarily required for each agent alone. With Aristogesic the physician has exceptionally wide latitude in adjusting the dosage to the lowest effective level.

The possibility of gastric distress from either salicylamide or corticosteroid is minimized because of lower dosage required. This is further reduced by the buffer action of aluminum hydroxide. And the ascorbic acid helps meet the increased need for this vitamin in stress conditions. Because of the low dosage, side effects with Aristogesic have been relatively infrequent and minor in nature. However, more serious side effects have traditionally been observed on all corticosteroid therapy. Patients on long-term Aristogesic therapy should, therefore, be observed carefully.

togesic*

Steroid–Analgesic Compound LEDERLE

for relief of *chronic*—but *less severe* pain of rheumatic origin



Collagen tissue (x250)

Indications: Mild cases of rheumatoid arthritis, tenosynovitis, synovitis, bursitis, mild spondylitis, myositis, fibrositis, neuritis and certain muscular strains.

Dosage: Average initial dosage: 2 capsules 3 or 4 times daily. Maintenance dosage to be adjusted according to response.

Each Aristogesic Capsule contains:

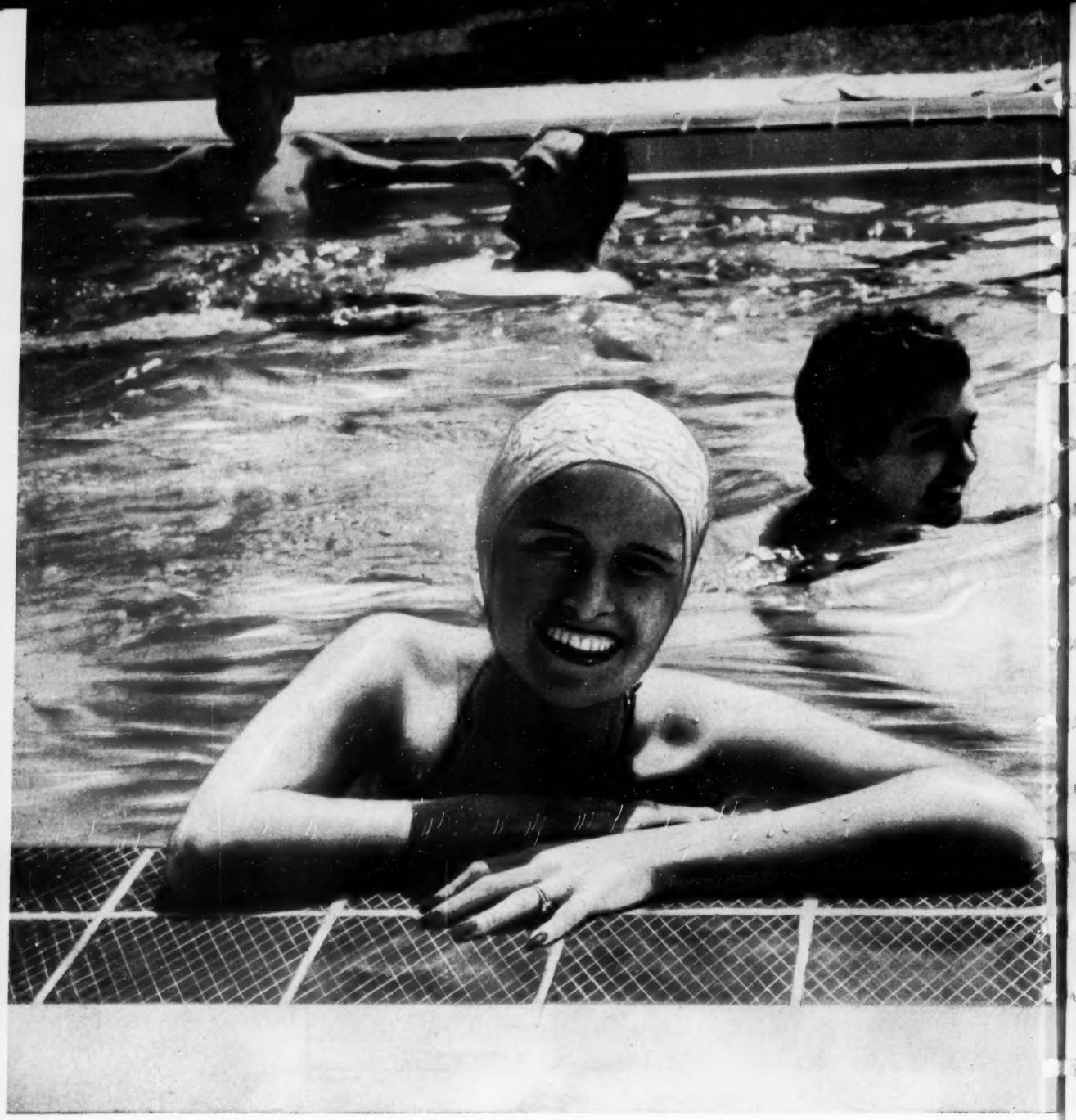
ARISTOCORT® Triamcinolone	0.5 mg.
Salicylamide	325 mg.
Aluminum Hydroxide	75 mg.
Ascorbic Acid	20 mg.

Supply: Bottles of 100.

*TRADEMARK

Lederle

LEDERLE LABORATORIES, A Division of AMERICAN CYANAMID COMPANY, Pearl River, New York



Of course, women like "Premarin"®

THERAPY for the menopause syndrome should relieve not only the psychic instability attendant the condition, but the vasomotor instability of estrogen decline as well. Though they would have a hard time explaining it in such medical terms, this is the reason women like "Premarin."

The patient isn't alone in her devotion to this natural estrogen. Doctors, husbands, and family all like what it does for the patient, the wife, and the homemaker.

When, because of the menopause, the psyche needs nursing—"Premarin" nurses. When hot flushes need suppressing, "Premarin" suppresses. In short, when you want to treat the whole menopause, (and how else is it to be treated?), let your choice be "Premarin," a complete natural estrogen complex.

"Premarin," conjugated estrogens (equine), is available as tablets and liquid, and also in combination with meprobamate or methyltestosterone.

Ayerst Laboratories • New York 16, N. Y. • Montreal, Canada

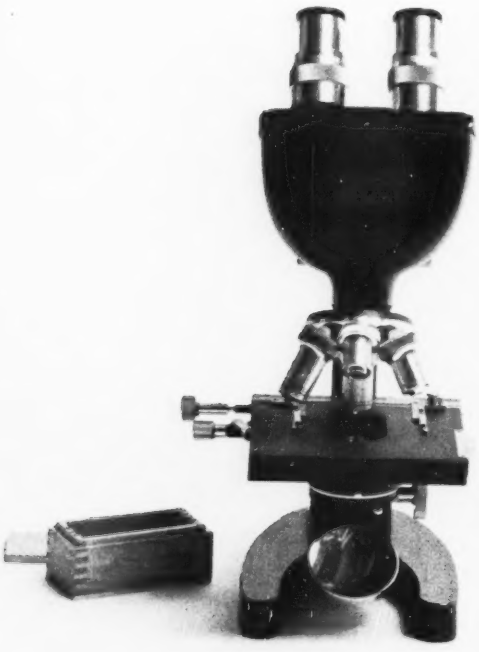
5854

against staph-, strep- and pneumococci

After Millions of Prescriptions
An Unparalleled Safety Record

©1959, ABBOTT LABORATORIES 903025

for the control of all coccal infections



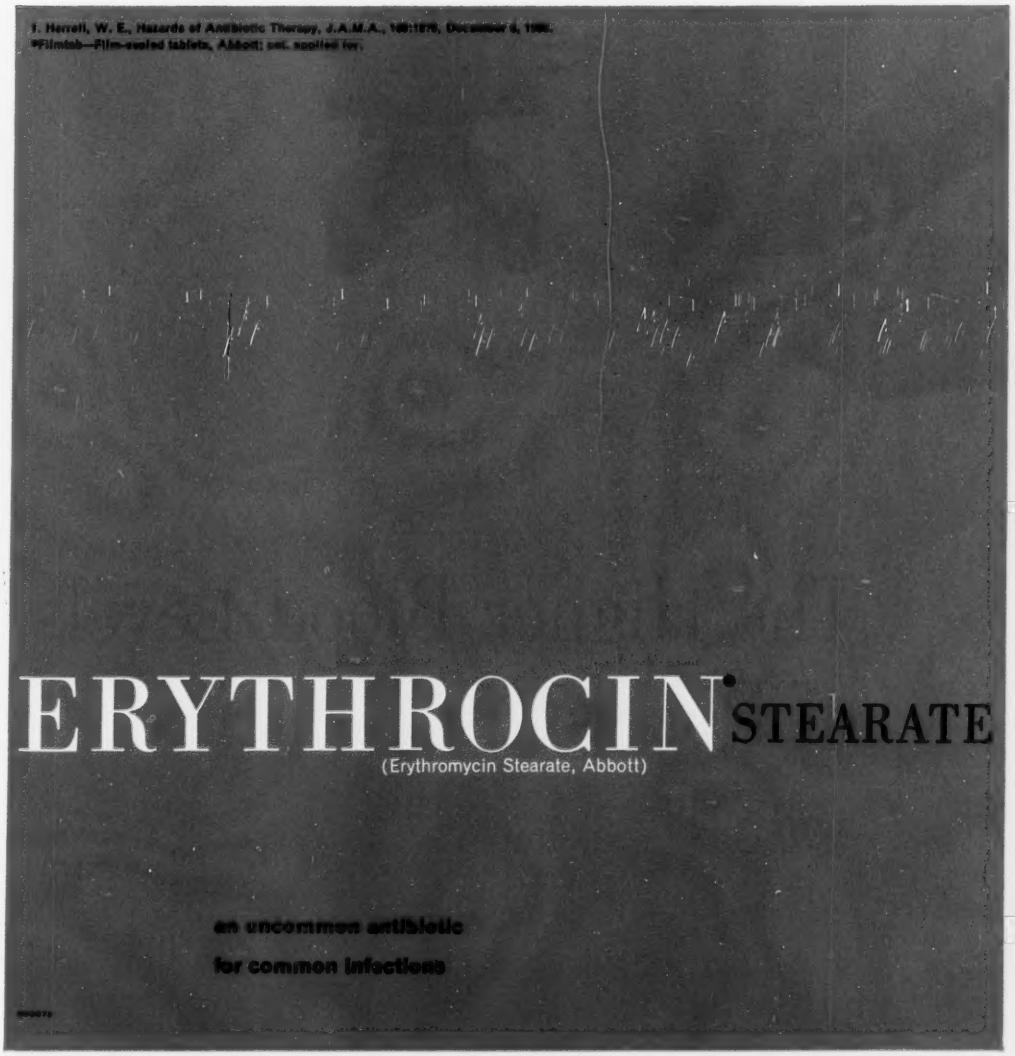
ABBOTT'S ANTIBIOTIC TRIAD

Provides fast, high blood and tissue concentrations—Because ERYTHROCIN Stearate is rapidly absorbed, patients get therapeutic blood and tissue levels within 30 minutes—and effective concentrations for at least six hours.

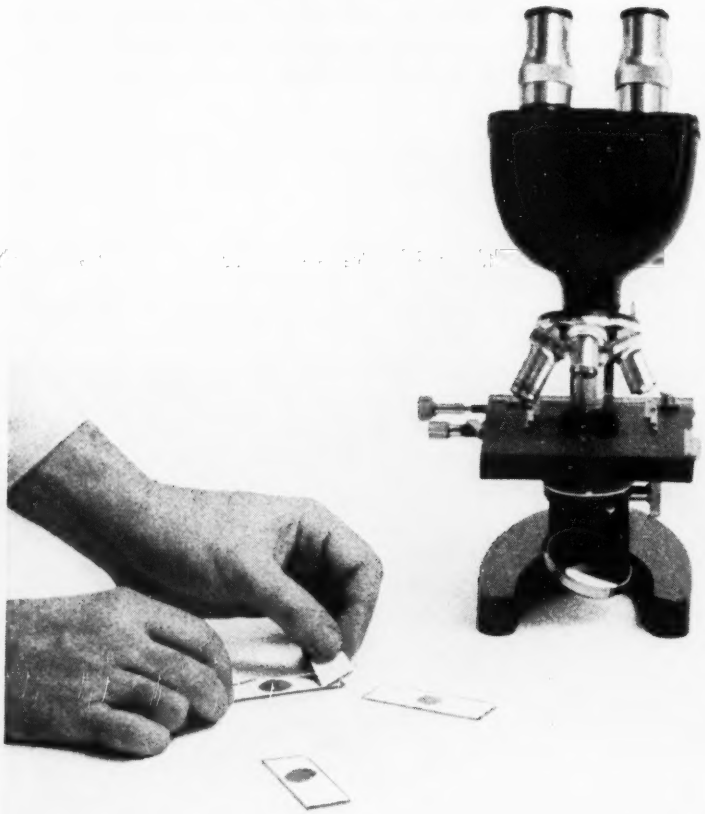
Supported by an unparalleled safety record—During all the years ERYTHROCIN has been prescribed, serious reactions have been practically nonexistent. Unlike penicillin, allergy is no problem. And, in contrast to "broad spectrum" action, the normal intestinal flora is virtually unaltered with ERYTHROCIN therapy. And only recently, a well-known investigator said, "Erythromycin is by far the least toxic of the commonly used antibiotics.[1]"

Offers bactericidal action—Unlike broad-spectrum antibiotics, **ERYTHROCIN** is classed as a bactericidal agent. It offers lethal action against common coccic invaders—resulting in prompt clinical responses.

Provides convenient dosage forms—Usual adult dose is 250 mg. four times daily. Children's dosage is reduced in proportion to body weight. ERYTHROCIN comes in Filmtabs® (100 and 250 mg.), bottles of 25 and 100. Also, in oral suspension and for intramuscular and intravenous use. Abbott


1. Herrell, W. E., Hazards of Antibiotic Therapy, J.A.M.A., 140:1276, December 4, 1949.
*Filmtab—Film-coated tablets, Abbott; not applied for.
ERYTHROCIN STEARATE
(Erythromycin Stearate, Abbott)
an uncommon antibiotic
for common infections

for those penicillin-sensitive organisms



The Higher Blood Levels of Potassium Penicillin V

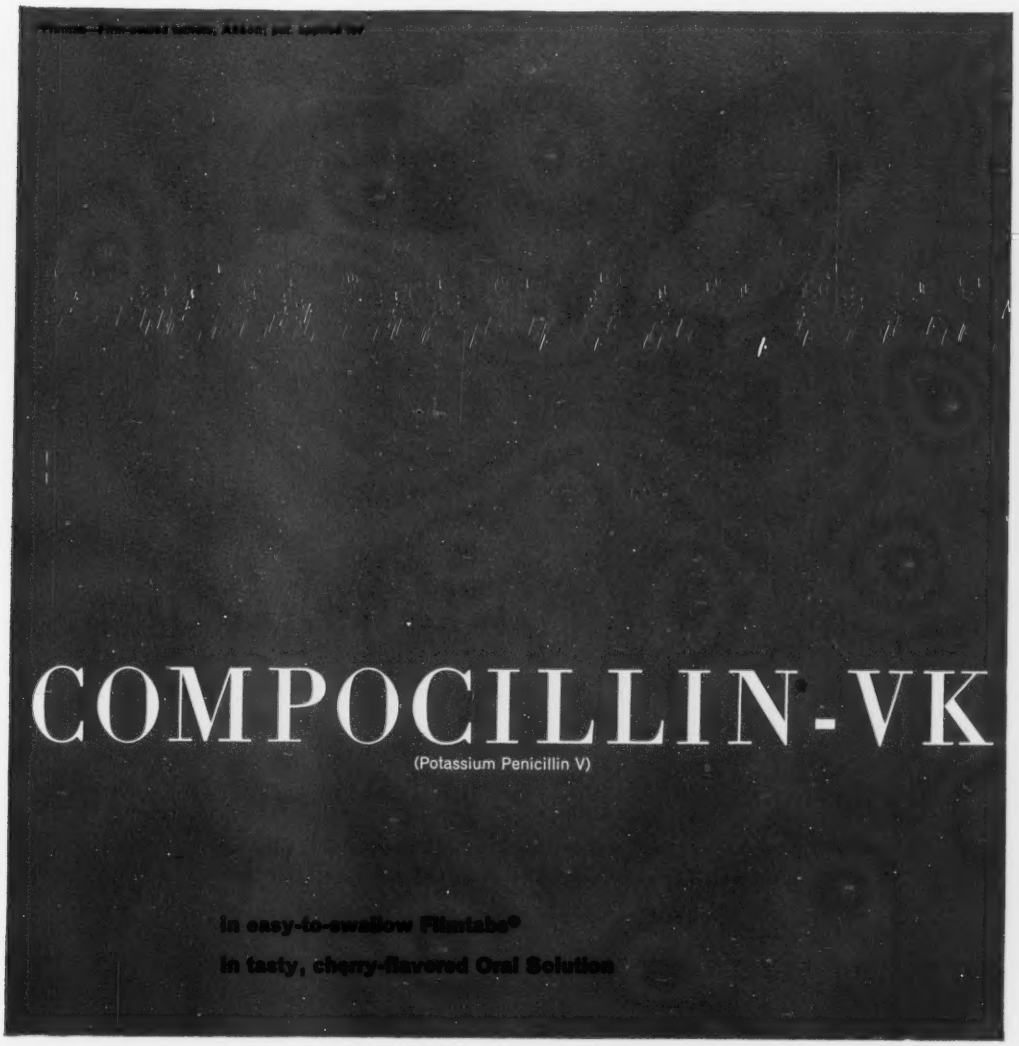
90-1074

COMPOCILLIN-VK Indications—Against all organisms sensitive to oral penicillin therapy. For prophylaxis and treatment of complications in viral conditions. As a prophylaxis in rheumatic fever and in rheumatic heart disease.

COMPOCILLIN-VK Dosage—Depending on the severity of the infection, the usual adult dose is 125 mg. to 250 mg. (200,000 to 400,000 units) every four to six hours. For children, dosage may be reduced in proportion to body weight.

COMPOCILLIN-VK Supplied—In Filmtabs, 125 mg. (200,000 units), bottles of 50 and 100; 250 mg. (400,000 units), bottles of 25 and 100. For oral solution, COMPOCILLIN-VK comes in 40-cc. and 80-cc. bottles. When reconstituted with water, each appealing (it's a clear red solution) 5-cc. teaspoonful represents 125 mg. (200,000 units) of potassium penicillin V.

Abbott



against serious and resistant coccal infections

An Important Lifesaving Antibiotic

903070

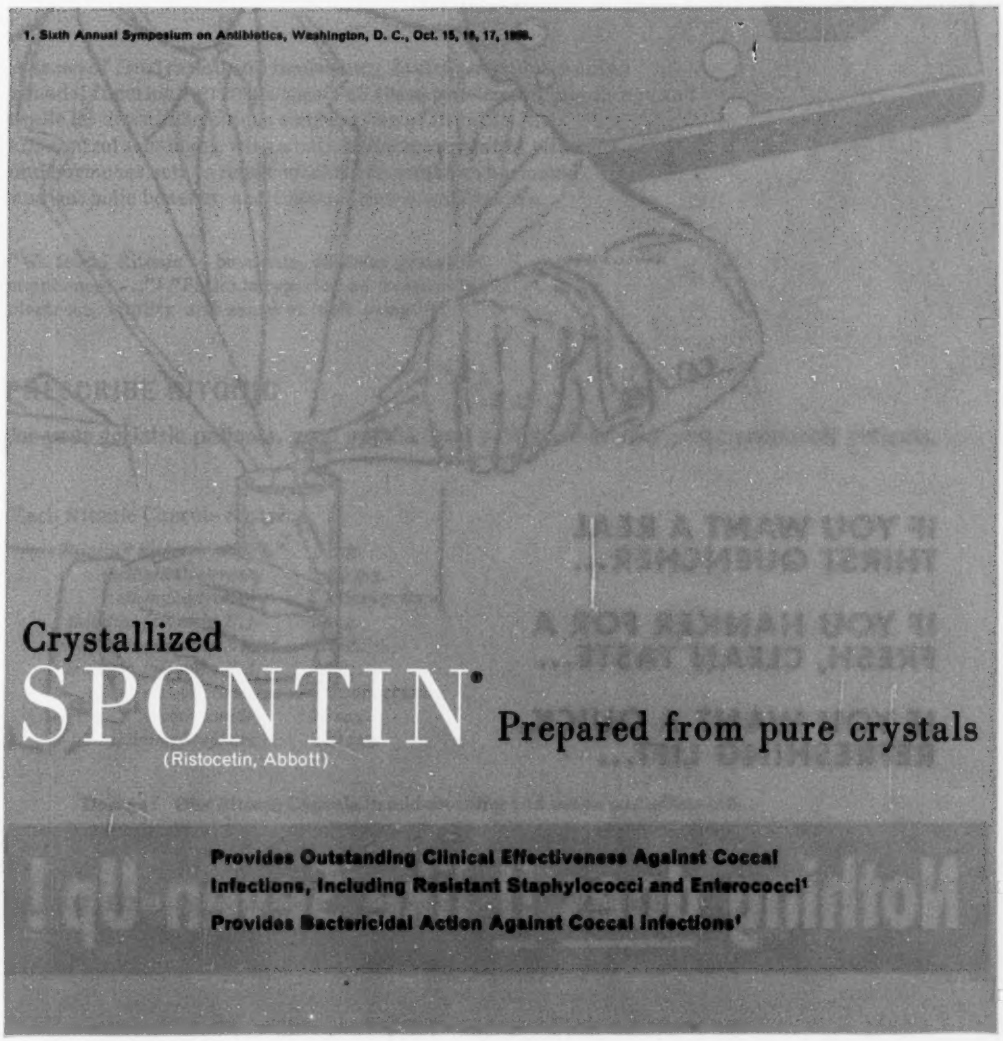
The dramatic story of SPONTIN can never really begin to be told.

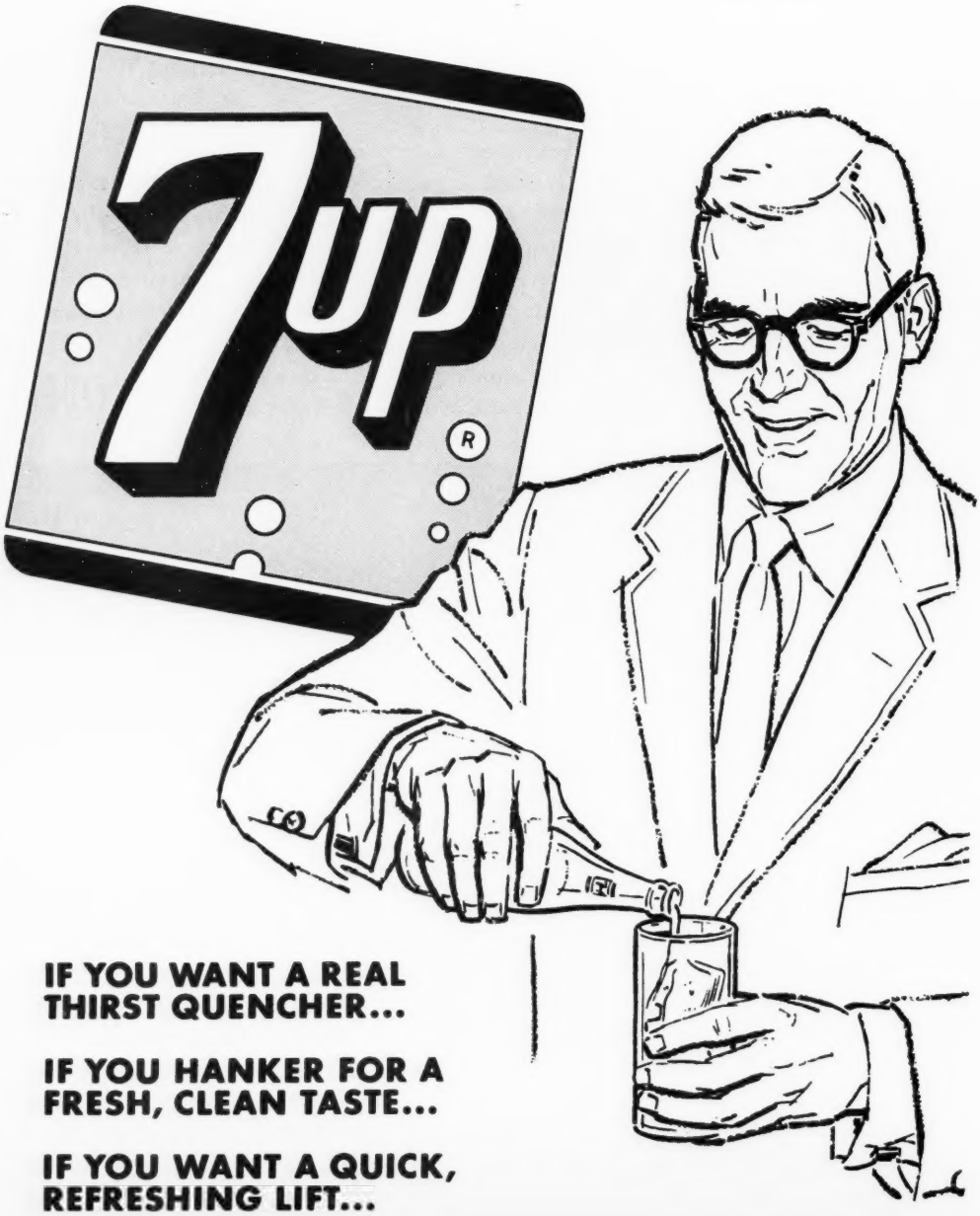
In little more than a year, this potent antibiotic has compiled an incredible record for saving lives —and often, after all other therapy had failed. Majority of successes involved patients critically ill with staphylococcal infections—conditions that had resisted all other known antibiotic therapy.

Meanwhile, careful attention to dosage recommendations has practically eliminated toxicity and side effects as serious obstacles to therapy. Also, recent improvements have been made in the manufacture of SPONTIN; the drug is now made from pure crystals.

So far, SPONTIN has proved to be a good answer, perhaps the best answer to the resistant staphylococcal problem—and of real value in other serious coccal infections.

Abbott


1. Sixth Annual Symposium on Antibiotics, Washington, D. C., Oct. 15, 16, 17, 1956.
Crystallized
SPONTIN®
(Ristocetin, Abbott)
Prepared from pure crystals
Provides Outstanding Clinical Effectiveness Against Coccal Infections, Including Resistant Staphylococci and Enterococci[1]
Provides Bactericidal Action Against Coccal Infections[1]



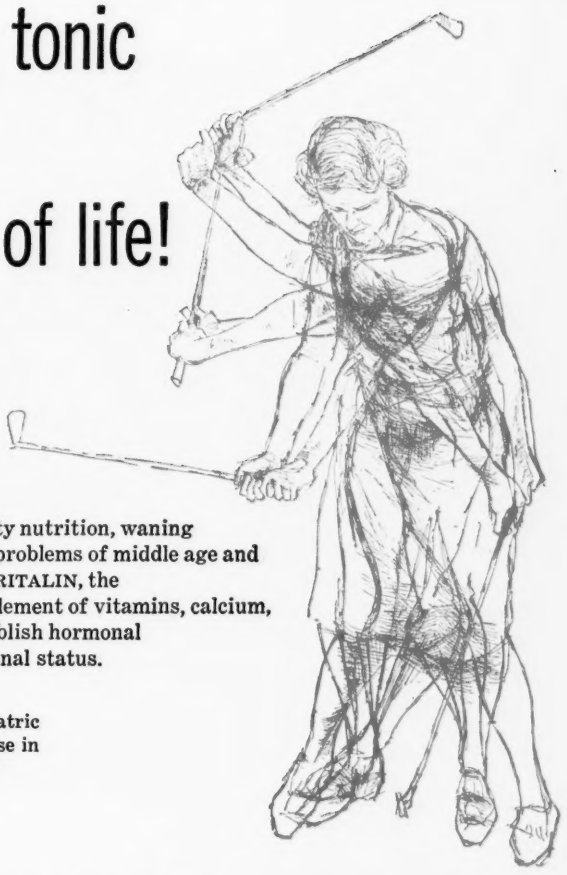
IF YOU WANT A REAL THIRST QUENCHER...

IF YOU HANKER FOR A FRESH, CLEAN TASTE...

IF YOU WANT A QUICK, REFRESHING LIFT...

Nothing does it like Seven-Up!

New revitalizing tonic brightens the second half of life!



Ritonic™

A sense of frustration and inadequacy, faulty nutrition, waning gonadal function—RITONIC meets all these problems of middle age and senile let-down. The unique combination of RITALIN, the *safe* central stimulant, with a balanced complement of vitamins, calcium, and hormones acts to renew vitality, re-establish hormonal and anabolic benefits, and improve nutritional status.

"We found Ritonic to be a safe, effective geriatric supplement . . ."[1] "Patients reported an increase in alertness, vitality and sense of well being."[2]

PRESCRIBE RITONIC

for your geriatric patients, your middle-aged patients and your postmenopausal patients.

Each Ritonic Capsule contains:

Ritalin® hydrochloride	5 mg.
methyltestosterone	1.25 mg.
ethinyl estradiol	5 micrograms
thiamin (vitamin B_1)	5 mg.
riboflavin (vitamin B_2)	1 mg.
pyridoxin (vitamin B_6)	2 mg.
vitamin B_{12} activity	2 micrograms
nicotinamide	25 mg.
dicalcium phosphate	250 mg.

Dosage: One Ritonic Capsule in mid-morning and one in mid-afternoon.
Supplied: Ritonic CAPSULES; bottles of 100.
References: 1. Natenshon, A. L.: J. Am. Geriatrics Soc. *6*:534 (July) 1958.
2. Bachrach, S.: To be published.
RITALIN® hydrochloride (methylphenidate hydrochloride CIBA)

CIBA SUMMIT, N. J.

2/2655MK

new 3-way build-up for the under par child...

Improve appetite and energy
with ample amounts of vitamins—B_1, B_6, B_{12}.

strengthen bodies with needed protein
Through the action of l-Lysine, cereal and other low-grade protein foods are up-graded to maximum growth potential.

discourage nutritional anemia
with iron in the well-tolerated form of ferric pyrophosphate.

new

INCREMIN®

Lysine-Vitamins

WITH IRON SYRUP

delicious cherry flavor— no unpleasant aftertaste

Average dosage is 1 teaspoonful daily. Available in bottles of 4 and 16 fl. oz.

Each teaspoonful (5 cc.) contains:

l-Lysine HCl	300 mg.
Vitamin B_{12} Crystalline	25 mcgm.
Thiamine HCl (B_1)	10 mg.
Pyridoxine HCl (B_6)	5 mg.
Ferric Pyrophosphate (Soluble)	250 mg.
Iron (as Ferric Pyrophosphate)	30 mg.
Sorbitol	3.5 Gm.

LEDERLE LABORATORIES. a Division of AMERICAN CYANAMID COMPANY, Pearl River, New York Lederle

ANNOUNCING

e antihypertensive

A TE SEVERE

DIUPRES

DIURIL® WITH RESERPINE

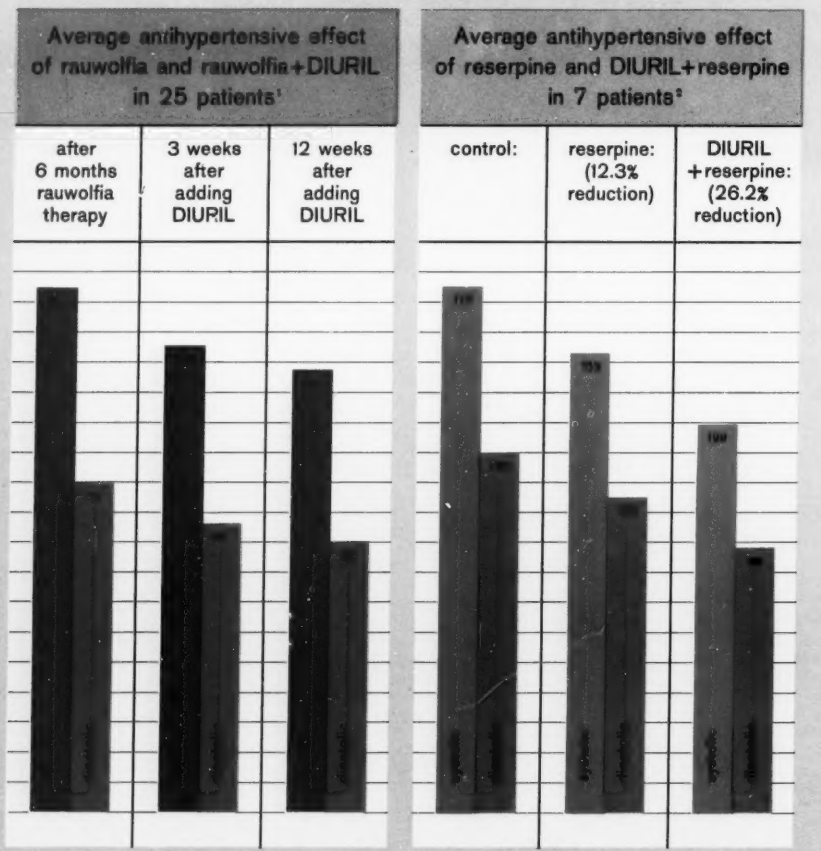
more hypertensives can be better controlled
with **DIUPRES** than with any other agent
. . . with greater simplicity and convenience

a logical alliance of two antihypertensives
you know and trust provides

increased effectiveness, decreased side effects

potentiated effect

DIUPRES produces an effect greater than either DIURIL or reserpine alone. It is effective in many patients who respond inadequately or not at all to either DIURIL or reserpine.


Average antihypertensive effect of rauwolfia and rauwolfia+DIURIL in 25 patients[1]
after 6 months rauwolfia therapy
3 weeks after adding DIURIL
12 weeks after adding DIURIL
Average antihypertensive effect of reserpine and DIURIL+reserpine in 7 patients[2]
control:
reserpine: (12.3% reduction)
DIURIL +reserpine: (26.2% reduction)

DIUPRES

DIURIL® WITH RESERPINE

effective therapy for most patients

DIUPRES by itself usually provides effective therapy for a majority of patients with mild or moderate hypertension, and even for many patients with severe hypertension. Many patients now treated with other agents which frequently cause distressing side effects can be adequately managed with well tolerated DIUPRES.

provides basic therapy

Should other drugs need to be added to DIUPRES, they can be given in much lower than usual dosage so that their side effects are often strikingly reduced.

rapid onset of effect

The antihypertensive action of DIUPRES is rapidly evident. (Considerable time may elapse before the antihypertensive effect of reserpine alone is observed.)

fewer and less severe side effects

DIUPRES may be expected to cause fewer and less severe side effects than are encountered with other antihypertensive therapy. (Since DIURIL and reserpine potentiate each other, the required dosage of each is usually less when given together as DIUPRES than when given alone. Such reduction in dosage makes side effects less likely to occur.)

often obviates weight gain

DIUPRES minimizes the problem of weight gain seen with reserpine (reserpine alone has been reported to produce weight gain in 50 per cent of patients).[1,4]

virtually eliminates fluid retention

DIUPRES is not likely to cause either clinical or subclinical retention of sodium and water. (Hypotensive drugs, particularly rauwolfia[5] and hydralazine,[6] may cause fluid retention. Even when such retention is subclinical, their antihypertensive effectiveness is diminished.[6])

diet more palatable

With DIUPRES, there is less need for rigid restriction of dietary salt, which patients find so burdensome.

> *"It may well be that the drug* [DIURIL] *produces the benefits of a markedly restricted low sodium diet but without its hardships."*[3]

subjective and objective improvement

DIUPRES allays anxiety and tension, thus reducing the emotional component of hypertension. Organic changes of hypertension may be arrested and reversed. Headache, dizziness, palpitations and tachycardia are usually promptly relieved by DIUPRES. When the *anginal syndrome* accompanies hypertension, the administration of DIUPRES may also cause diminution or even disappearance of this syndrome concurrent with control of the hypertension.

convenient, controlled dosage

Instead of two separate prescriptions, you write one prescription . . . the patient takes one tablet, rather than two different tablets . . . and the dosage schedule is easier for the patient to remember and follow.

> *"patients have fewer lapses and make fewer mistakes in dosage, the simpler the regimen can be made. Therefore I do not hesitate to use more than one medicament combined in one tablet, provided this gives approximately the correct dosage of each."*[6]

economical

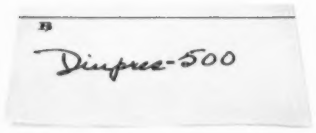
DIUPRES will cost the patient less than if he were given two separate prescriptions for its components.

Indications:
DIUPRES is indicated in hypertension of all degrees of severity. It can be used in the following ways:

- as total therapy
- as primary therapy, adding other drugs if necessary
- as replacement or adjunctive therapy in patients now treated with other agents

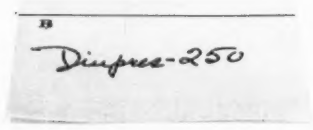
Precautions:
The precautions normally observed with DIURIL or reserpine apply to DIUPRES. Additional information on DIUPRES is available to physicians on request.

Recommended dosage range:
DIUPRES-500—one tablet one to three times a day.
DIUPRES-250—one tablet one to four times a day.
If necessary, other agents may be added.
If the patient is receiving ganglion blocking agents or hydralazine, their dosage should be cut by 50 per cent when DIUPRES is added.



DIUPRES-500

500 mg. DIURIL (chlorothiazide), 0.125 mg. reserpine.
Bottles of 100, 1000.



DIUPRES-250

250 mg. DIURIL (chlorothiazide), 0.125 mg. reserpine.
Bottles of 100, 1000.

the first "wide range" antihypertensive

DIUPRES

DIURIL® WITH RESERPINE

1. Rochelle, J. B., III, Bullock, A. C., and Ford, R. V.: Potentiation of antihypertensive therapy by use of chlorothiazide, *J.A.M.A.* 168:410, Sept. 27, 1958. 2. Freis, E. D., Wanko, A., Wilson, I. M., and Parrish, A. E.: Treatment of essential hypertension with chlorothiazide (Diuril), *J.A.M.A.* 166:137, Jan. 11, 1958. 3. Freis, E. D.: Treatment of hypertension. (Presented at the Annual Meeting of Southern Medical Association, Nov. 13, 1957.) 4. Moyer, J. H., Dennis, E., and Ford, R.: Drug therapy (Rauwolfia) of hypertension, *A.M.A. Arch. Int. Med.* 96:530, Oct. 1955. 5. Perera, G. A.: Edema and congestive failure related to administration of rauwolfia serpentina, *J.A.M.A.* 159:439, Oct. 1, 1955. 6. Wilkins, R. W.: Precautions in use of antihypertensive drugs, including chlorothiazide, *J.A.M.A.* 167:801, June 14, 1958.

MERCK SHARP & DOHME, DIVISION OF MERCK & CO., INC., PHILADELPHIA 1, PA.

*DIUPRES and DIURIL (chlorothiazide) are trademarks of Merck & Co., Inc.

running noses

and open stuffed noses orally

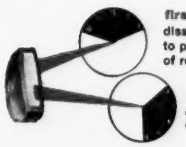
with TRIAMINIC, the oral nasal decongestant

- in nasal and paranasal congestion
- in sinusitis
- in postnasal drip
- in allergic reactions of the upper respiratory tract

safer and more effective than topical medication

- reaches *all* respiratory membranes systemically
- avoids "nose drop addiction"
- presents no problem of rebound congestion
- provides longer-lasting relief

Relief with Triaminic is prompt and prolonged because of this special timed-release action . . . beneficial effect starts in minutes, lasts for hours.


first—the outer layer dissolves within minutes to produce 3 to 4 hours of relief
then—the inner core disintegrates to give 3 to 4 more hours of relief

Each* TRIAMINIC *Tablet provides:

Phenylpropanolamine HCl . . .	50 mg.
Pheniramine maleate	25 mg.
Pyrilamine maleate	25 mg.

One-half of this formula is in the outer layer, the other half is in the core.

Dosage: One tablet in the morning, mid-afternoon and in the evening, if needed.

Triaminic®

Also available: For the occasional patient who requires only half dosage: timed-release TRIAMINIC JUVELETS. Each Juvelet is equivalent to ½ of a Triaminic Tablet.

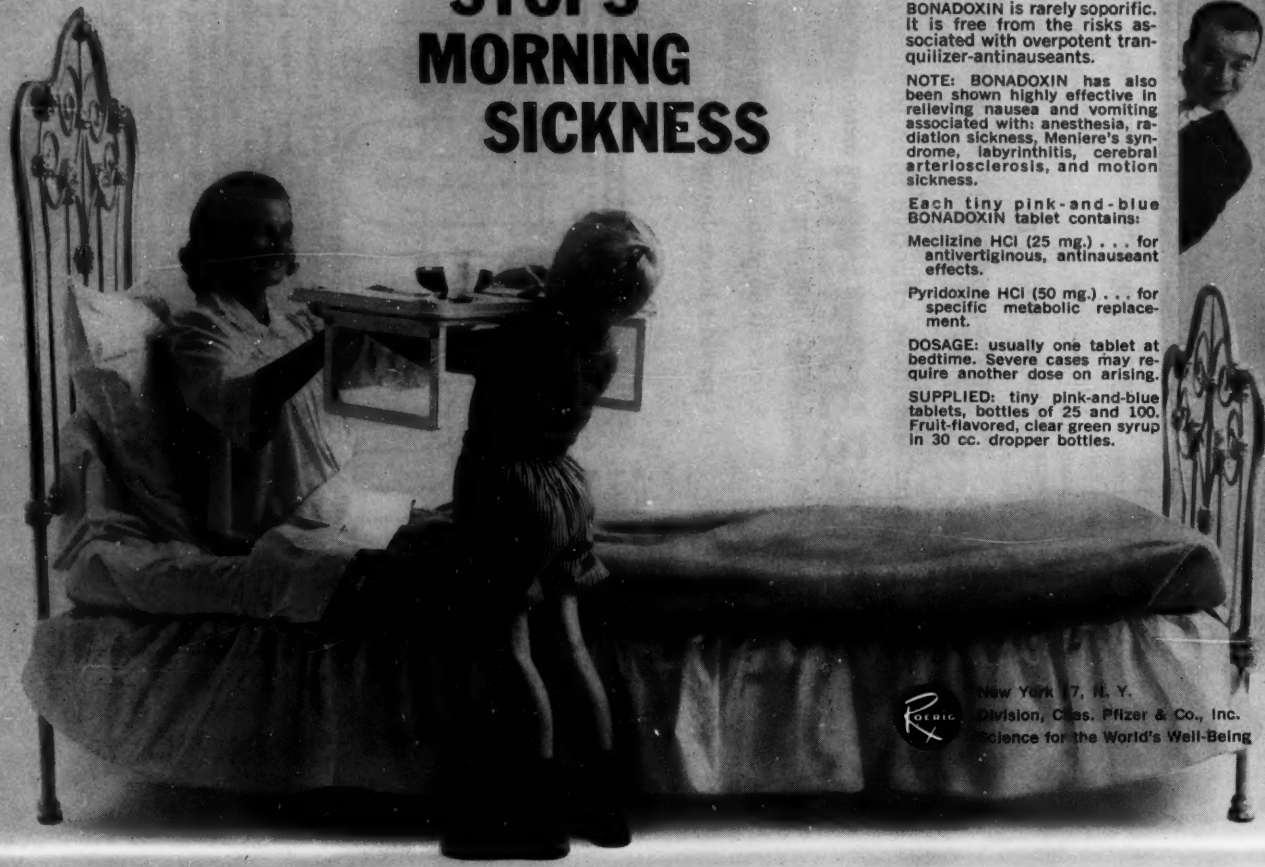
For those patients who prefer liquid medication: TRIAMINIC SYRUP. Each 5 ml. tsp. of this palatable syrup is equivalent to ¼ of a Triaminic Tablet.

SMITH-DORSEY • a division of The Wander Company • Lincoln, Nebraska • Peterborough, Canada

BONADOXIN®

(tablets and drops)

STOPS STOPS STOPS MORNING SICKNESS



BONADOXIN Tablets relieve nausea and vomiting of pregnancy in 9 out of 10,[1-7] often within a few hours.

Moreover, a controlled study of 620 cases reported that with **BONADOXIN** "toxicity and intolerance [are] zero."[1] **BONADOXIN** is rarely soporific. It is free from the risks associated with overpotent tranquilizer-antinauseants.

NOTE: **BONADOXIN** has also been shown highly effective in relieving nausea and vomiting associated with: anesthesia, radiation sickness, Meniere's syndrome, labyrinthitis, cerebral arteriosclerosis, and motion sickness.

Each tiny pink-and-blue BONADOXIN tablet contains:

Meclizine HCl (25 mg.) . . . for antivertiginous, antinauseant effects.

Pyridoxine HCl (50 mg.) . . . for specific metabolic replacement.

DOSAGE: usually one tablet at bedtime. Severe cases may require another dose on arising.

SUPPLIED: tiny pink-and-blue tablets, bottles of 25 and 100. Fruit-flavored, clear green syrup in 30 cc. dropper bottles.

Infant colic? **BONADOXIN DROPS** are antispasmodic...stop colic in 84%,[8-10] without the risk of belladonna and barbiturates.

Each cc. contains:
Meclizine dihydrochloride . . 8.33 mg.
Pyridoxine hydrochloride . . . 16.67 mg.

Dosage:

under 6 months . . . . 0.5 cc.	2 or 3 times daily, on the tongue, in fruit juice or water
6 months to 2 years . . . . 1.5 to 2 cc.	
2 to 6 years . . 3 cc.	
adults and children over 6 . . . . . 1 tsp. (5 cc.)	

References: 1. Goldsmith, J. W.: Minnesota Med. 40:99 (Feb.) 1957. 2. Groskloss, H. H., et al.: Clin. Med. 2:885 (Sept.) 1955. 3. Weinberg, A., and Werner, W. E. F.: Am. Pract. & Digest Treat. 6:580 (April) 1955. 4. Crawley, C. R.: West. J. Surg. 8:463 (Aug.) 1956. 5. Tartikoff, G.: Clin. Med. 3:223 (March) 1955. 6. Dunn, R. D., and Fox, L. P.: Clinical exhibit. 7. Codling, J. W., and Lowden, R. J.: Northwest Med. 57:331 (March) 1958. 8. Dougan, H. T.: Personal communication. 9. Leonard, C. L.: Personal communication. 10. Steinberg, C. L.: Personal communication.

New York 17, N. Y.
Division, Chas. Pfizer & Co., Inc.
Science for the World's Well-Being

B. I. D.

ULCER CONTROL

all day

NEW

DARICON*

oxyphencyclimine hydrochloride

TABLETS

all night

patient comfort

Natural Prolonged Action–The action of DARICON, a more potent and better tolerated anticholinergic, is consistently prolonged because it has a unique chemical structure and is not dependent on "mechanical" means (e.g., special coating, adsorption on ion-exchange resin).

In addition to peptic ulcer, DARICON is also indicated for other gastrointestinal disorders characterized by hypersecretion, hypermotility and spasm (e.g., functional bowel syndrome, chronic nonspecific ulcerative colitis and biliary tract disease).

Dosage: 10 mg. b.i.d. (morning and evening). **Supply:** Tablets, 10 mg., white, scored. Bottles of 60 and 500.

*Trademark

EVEN REFRACTORY CASES RESPOND

Pfizer *Science for the world's well-being*

PFIZER LABORATORIES

Division, Chas. Pfizer & Co., Inc.

Brooklyn 6, N. Y.

In potentially-serious infections...

*TRADEMARK, REG. U. S. PAT. OFF.

†TRADEMARK, REG. U. S. PAT. OFF.—THE UPJOHN BRAND OF TETRACYCLINE

‡‡TRADEMARK, REG. U. S. PAT. OFF.—THE UPJOHN BRAND OF CRYSTALLINE NOVOBIOCIN SODIUM

††TRADEMARK

The Upjohn Company, Kalamazoo, Michigan

Upjohn

Make new Panalba*

(PANmycin† Phosphate plus ALBAmycin)**

your broad-spectrum antibiotic of first resort

Available forms:

1. Panalba Capsules, bottles of 16 and 100 capsules. Each capsule contains:

Panmycin phosphate (tetracycline phosphate complex) equivalent to tetracycline hydrochloride .....250 mg.
Albamycin (as novobiocin sodium)...125 mg.

2. Panalba KM,†† Flavored Granules, 60 cc. size bottle. When sufficient water is added to fill the bottle, each teaspoonful (5 cc.) contains:

Panmycin (tetracycline) equivalent to tetracycline hydrochloride .....125 mg.
Albamycin (as novobiocin calcium)..62.5 mg.
Potassium metaphosphate .....100 mg.

Dosage:

Panalba Capsules. Usual adult dosage is 1 or 2 capsules 3 or 4 times a day.

Panalba KM Granules
For the treatment of moderately acute infections in infants and children, the recommended dosage is 1 teaspoonful per 15 to 20 lbs. of body weight per day, administered in 2 to 4 equal doses. Severe or prolonged infections require higher doses. Dosage for adults is 2 to 4 teaspoonfuls 3 or 4 times daily, depending on the type and severity of the infection.

UNIQUE VITAMIN SUPPLEMENT

NEW VIGRAN CHEWABLES

SQUIBB MULTIPLE VITAMIN SOFT TABLETS

fruit-punch flavored tablets that will actually "melt in the mouth"

can be chewed like candy

can be crushed and sprinkled on cereal or other food

can be dissolved in water, juice or milk

can be sucked and will dissolve like a lozenge

can be easily swallowed (small tablet size)

VIGRAN CHEWABLES *taste like candy*, but contain *no ingredients harmful to teeth.* Important, too, is that VIGRAN CHEWABLES *dissolve easily* in the mouth and *smell good.* These advantages will also appeal to your elderly patients. And VIGRAN CHEWABLES provide at least 125% of the minimum daily requirements for vitamins A, D, B_1, B_2, niacinamide and C, and significant amounts of other essential vitamins.

Each VIGRAN CHEWABLE tablet contains:

Vitamin A	5,000 U.S.P. units
Vitamin D	1,000 U.S.P. units
Vitamin C	75 mg.
Vitamin B_1	3 mg.
Vitamin B_2	3 mg.
Vitamin B_6	2 mg.
Niacinamide	25 mg.
Calcium Pantothenate	3 mg.
Vitamin B_{12}	5 mcg.

Available in Rx-size bottles of 30 and 90.

SQUIBB

Squibb Quality—the Priceless Ingredient

*Vigran® is a Squibb trademark

maintenance therapy is still fundamental treatment

Sound, conservative therapy with salicylates has been consistently reaffirmed as basic, long-term maintenance therapy in the arthritides.[1,2,3]

Buffered Pabirin provides superior maintenance therapy. It epitomizes fundamental long-term basic therapy since it can be given month after month without serious complications and with minimal problems to patient and doctor alike.

Buffered Pabirin is formulated to provide high and sustained salicylate blood levels. Each tablet consists of an outer layer containing a buffer (aluminum hydroxide), para-aminobenzoic acid, and ascorbic acid; a core of acetylsalicylic acid.

In the stomach, the outer layer quickly releases the buffer, which protects against nausea, dyspepsia and other gastrointestinal symptoms so frequently encountered with salicylates alone. The core of Buffered Pabirin then disintegrates rapidly, permitting rapid absorption of the acetylsalicylic acid for faster pain relief.

References: 1. Hart, D.; Bagnall, A. W.; Bunim, J. J., and Polley, F. H.: Ninth International Congress on Rheumatic Diseases, Toronto, Ont. (June 25) 1957. 2. Report of Joint Committee, Medical Research Council & Nuffield Foundation, Treatment of Rheumatoid Arthritis, British Medical Journal (April 13) 1957. 3. Friend, D. G.: New England J. Med. 257:278 (Aug.) 1957.

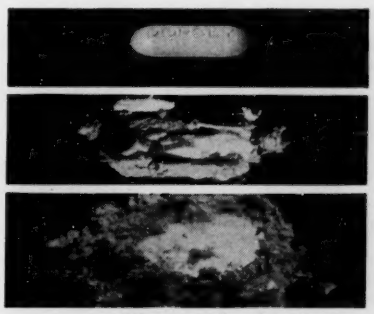
Buffered Pabirin® *Tablets*

Each tablet contains:

Acetylsalicylic acid (5 gr.)	300 mg.
Para-aminobenzoic acid (5 gr.)	300 mg.
Ascorbic acid	50 mg.
Dried aluminum hydroxide gel	100 mg.

All Buffered Pabirin is sodium- and potassium-free.

Dosage: Two or three tablets 3 or 4 times daily.



Photographs show 2-stage Tandem Release disintegration.

SMITH-DORSEY • a division of The Wander Company • Lincoln, Nebraska • Peterborough, Canada

in skin disorders

Decadron*

DEXAMETHASONE

treats more patients more effectively
a new order of magnitude in corticosteroid effectiveness
a new order of magnitude in margin of safety

Striking clinical results with DECADRON are reported† in 92 percent of 319 patients with dermatological disorders, including cases previously unresponsive or resistant to corticosteroids. There were no major complications, and even minor side effects occurred in less than eight percent of patients.

Moreover, in many cases reactions induced by previous steroid therapy, such as edema, Cushingoid appearance, headache, vertigo, muscular weakness, depression, hirsutism, and glycosuria, **disappeared during therapy with DECADRON.** †Analysis of clinical reports.

Dosage: One 0.75 mg. tablet of DECADRON will usually replace one 4 mg. tablet of methylprednisolone or triamcinolone, one 5 mg. tablet of prednisone or prednisolone, one 20 mg. tablet of hydrocortisone, or one 25 mg. tablet of cortisone.

Supplied: As 0.75 mg. and 0.5 mg. scored, pentagon-shaped tablets in bottles of 100 and 1000.

©1958 Merck & Co., Inc. *DECADRON is a trademark of Merck & Co., Inc.

MERCK SHARP & DOHME
DIVISION OF MERCK & CO., Inc., PHILADELPHIA 1, PA.

More effective clinically

in **LOW BACK PAIN**

TORTICOLLIS

BURSITIS and

ANXIETY STATES

Trancopal®

the first true tranquilaxant

***Potent* MUSCLE RELAXANT**
and equally effective
***as a* TRANQUILIZER**

Unrelated chemically to any other therapeutic agent in current use. Better tolerated and safer than older drugs.

for clinical results in 4092 patients *see inside*

Trancopal

Potent **MUSCLE RELAXANT**
and equally effective as a **TRANQUILIZER**

clinical results in 4092 patients[5]

"We have just started using it [Trancopal] for relaxing spastic musculature and are *very much encouraged.*"[1]

Baker, University of Minnesota Medical School

"Chlormethazanone [Trancopal] not only relieved *painful muscle spasm*, but allowed the patients to resume their normal activities with no interference in performance of either manual or intellectual tasks."[2]

Lichtman, New York Polyclinic Medical School and Hospital

"The effect of this preparation in these cases [skeletal muscle spasm] was *excellent and prompt . . .*"[3]

Mullin and Epifano, Long Island College Hospital

"In 120 patients with *anxiety or tension states*, 114 received satisfactory control of their condition. *Severe dysmenorrhea* and *premenstrual tension* in 65 patients refractory to the usual medications were relieved satisfactorily in 56."[4]

Lichtman

91% Effective in Musculoskeletal Disorders

Indications	*Degree of Effectiveness*†
Low back pain (lumbago, sacroiliac)	93%
Traumatic skeletal muscle spasm	86%
Torticollis (stiff neck)	96%
Bursitis (muscle spasm)	95%
Rheumatoid arthritis (muscle spasm)	82%
Osteoarthritis (muscle spasm)	89%
Disk syndrome (muscle spasm)	98%

89% Effective in Psychogenic Disorders

Indications	*Degree of Effectiveness*†
Anxiety (tension) states	93%
Dysmenorrhea, premenstrual tension	87%
Bronchial asthma	77%

†*Excellent, good and fair*

The results of clinical studies of over 4092 patients by 105 physicians demonstrate that Trancopal often is effective when other drugs have failed. From these studies it is clear that Trancopal probably can provide more help for a greater number of tense, spastic, and/or emotionally upset patients than any other pharmaceutical agent in current use.

Dosage:
Usual adult dose, 1 Caplet (100 mg.) three or four times daily. Children (from 5 to 12 years), ½ Caplet (50 mg.) three or four times daily.

Supplied:
Trancopal Caplets® (peach colored, scored; 100 mg., bottles of 100 and 1000.

Winthrop

Trancopal

the first true tranquilaxant

Potent MUSCLE RELAXANT *and equally effective as a* TRANQUILIZER

ADVANTAGES OF TRANCOPAL

- Lower incidence of side effects than with zoxazolamine, methocarbamol or meprobamate.
- No known contraindications. Blood pressure, pulse rate, respiration and digestive processes unaffected by therapeutic dosage. No effects on hematopoietic system or liver and kidney function.
- Low toxicity.
- No gastric irritation. Can be taken before meals.
- No clouding of consciousness, no euphoria or depression.
- No perceptible soporific effect, even in high dosage.

INDICATIONS

Musculoskeletal

Low back pain (lumbago)
Neck pain (torticollis, etc.)
Bursitis
Rheumatoid arthritis
Osteoarthritis
Disk syndrome
Fibrositis
Joint disorders (ankle sprain, tennis elbow, etc.)
Myositis
Postoperative myalgias

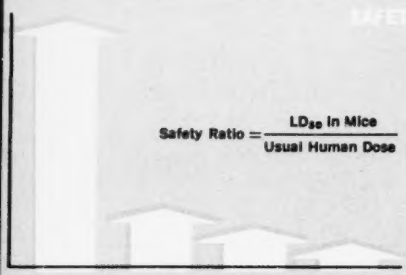
Psychogenic

Anxiety and tension states
Dysmenorrhea
Premenstrual tension
Asthma
Angina pectoris

Neurologic

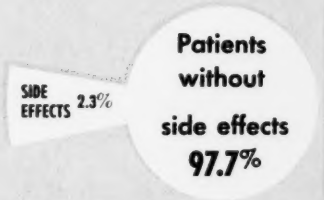
Muscle spasm (in paralysis agitans, multiple sclerosis, hemiplegia, cerebral palsy)

SAFETY



$$\text{Safety Ratio} = \frac{LD_{50} \text{ in Mice}}{\text{Usual Human Dose}}$$

Comparative pharmacologic tests showed that Trancopal is up to thirteen times as safe, or up to thirteen times less toxic. The measure of safety was the LD_{50} in mice/usual human dose.



INCIDENCE OF SIDE EFFECTS WITH TRANCOPAL IN 4262 PATIENTS.

SUPPLIED

Trancopal Caplets (peach colored, scored) 100 mg., bottles of 100 and 1000.

REFERENCES

1. Baker, A. B.: Drugs to relieve increased tonus, spasticity, and rigidity of muscles, Modern Med. 26:140, April 15, 1958 • 2. Lichtman, A. L.: New developments in muscle relaxant therapy, Kentucky Acad. Gen. Pract. J. 4:28, Oct., 1958. • 3. Mullin, W. G., and Epifano, Leonard: To be published. • 4. Lichtman, A. L.: To be published. • 5. Cooperative Study, Department of Medical Research, Winthrop Laboratories.

Winthrop Laboratories • New York 18, N. Y.

Trancopal (brand of chlormethazanone) and Caplets, trademarks reg. U. S. Pat. Off. Printed in U. S. A. (4067A)

APPREHENSIVE surgical and obstetrical patients

respond well to

VISTARIL*

hydroxyzine pamoate

Outstanding safety
establishes peaceful indifference to preoperative preparation *without serious hypotensive effects.*

Psychotherapeutic potency
makes possible the maintenance of an adequate degree of narcosis with reduced doses of narcotics.

relieves tension and controls emesis in both postoperative and postpartum patients.

Recommended Oral Dose: up to 400 mg. daily in divided doses
Recommended Parenteral Dose: 25-50 mg. (1-2 cc.) I.M. q.4 h., p.r.n.

Supplied as: Vistaril Capsules—25 mg., 50 mg., 100 mg.
Vistaril Parenteral Solution—10 cc. vials and 2 cc. Steraject® Cartridges, each cc. containing 25 mg. hydroxyzine (as the HCl)

Pfizer *Science for the world's well-being* *Trademark

PFIZER LABORATORIES Division, Chas. Pfizer & Co., Inc., Brooklyn 6, New York

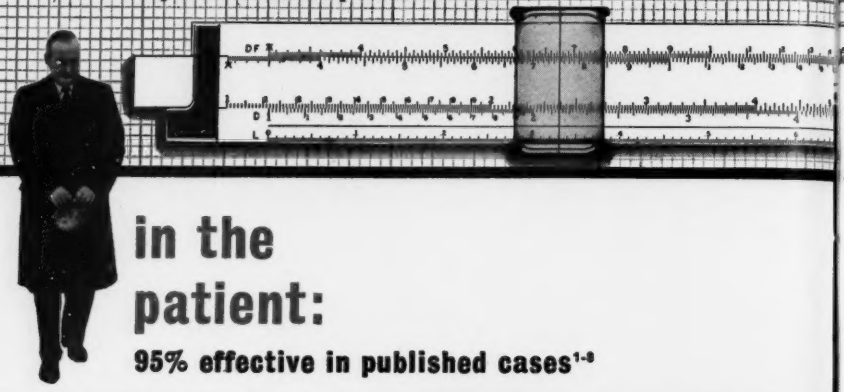
PRONOUNCED TAY-O

Rx Tao

(troleandomycin)

Capsules / Oral Suspension

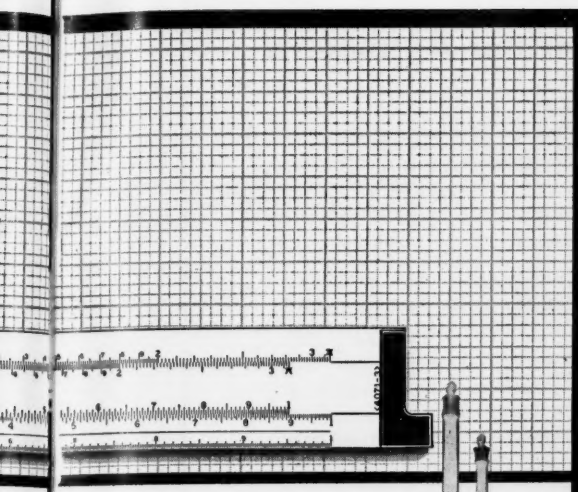
* *designed for superior control of common Gram-positive infections*



in the patient:

95% effective in published cases[1-8]

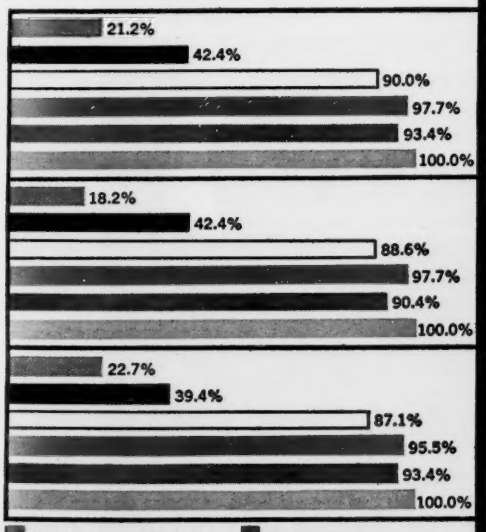
Conditions treated	No. of Patients	Cured	Improved	Failure
ALL INFECTIONS	558	448	80	30
Respiratory infections	258	208	31	19
Pharyngitis and/or tonsillitis	65	58	5	2
Pneumonia	90	66	17	7
Infectious asthma	44	38	–	6
Otitis media	31	29	2	–
Other respiratory (bronchitis, bronchiolitis, bronchiectasis, pneumonitis, laryngotracheitis, strep throat)	28	17	7	4
Skin and soft tissue infections	230	191	38	1
Infected wounds, incisions and lacerations	41	33	8	–
Abscesses	51	42	8	–
Furunculosis	58	51	6	1
Acne, pustular	43	28	15	–
Pyoderma	19	19	–	–
Other skin and soft tissue (infected burns, cellulitis, impetigo, ulcers, others)	18	17	1	–
Genitourinary infections	28	19	3	6
Acute pyelitis and cystitis	10	8	2	–
Urethritis with gonorrhea or cystitis	8	8	–	–
Pyelonephritis	4	1	–	3
Salpingitis	5	1	1	3
Pelvic inflammation with endometriosis	1	1	–	–
Miscellaneous (adenitis, enteritis, enterocolitis, subacute bacterial endocarditis, fever, hematoma, staphylococcus carriers, osteomyelitis, tenosynovitis, septic arthritis, acute bursitis, periarthritis)	42	30	8	4



in the laboratory:

over 90% effective against resistant staph

COMPARATIVE TESTS BY THREE METHODS (DISC, TUBE DILUTION, CYLINDER PLATE) ON 130 STAPHYLOCOCCI[9]



Percentage of organisms inhibited by the range of concentrations listed for each antibiotic.

Other Tao advantages:

Rapidly absorbed—stable in gastric acid,[7] TAO needs no retarding protective coating

Low in toxicity—freedom from side effects in 96% of patients treated; cessation of therapy is rarely required

Highly palatable—"practically tasteless"[7] active ingredient in a pleasant cherry-flavored medium.

Dosage and Administration: Dosage varies according to the severity of the infection. **For adults,** the average dose is 250 mg. q.i.d.; to 500 mg. q.i.d. in more severe infections. **For children** 8 months to 8 years, a daily dose of approximately 30 mg./Kg. body weight in divided doses has been found effective. Since TAO is therapeutically stable in gastric acid, it may be administered without regard to meals.

Supplied: TAO Capsules—250 mg. and 125 mg., bottles of 60. TAO for Oral Suspension—1.5 Gm., 125 mg. per teaspoonful (5 cc.) when reconstituted; unusually palatable cherry flavor; 2 oz. bottle.

References: 1. Koch, R., and Asay, L. D.: J. Pediat., in press. 2. Leming, B. H., Jr., et al.: Paper presented at the Symposium on Antibiotics, Washington, D. C., Oct. 15-17, 1958. 3. Mellman, et al.: Paper presented at the Symposium on Antibiotics, Washington, D. C., Oct. 15-17, 1958. 4. Olansky, S., and McCormick, G. E., Jr.: Paper presented at the Symposium on Antibiotics, Washington, D. C., Oct. 15-17, 1958. 5. Shubin, H., et al.: Antibiotics Annual 1957-1958, New York, N. Y., Medical Encyclopedia, Inc., 1958, p. 679. 6. Isenberg, H., and Karelitz, S.: Paper presented at the Symposium on Antibiotics, Washington, D. C., Oct. 15-17, 1958. 7. Wennersten, J. R.: Antibiotic Med. & Clin. Therapy 5:527 (Aug.) 1958. 8. Kaplan, M. A., and Goldin, M.: Paper presented at the Symposium on Antibiotics, Washington, D. C., Oct. 15-17, 1958. 9. Truant, J. P.: Paper presented at the Symposium on Antibiotics, Washington, D. C., Oct. 15-17, 1958.

Tao dosage forms— for specific clinical situations

Tao Pediatric Drops

For children—flavorful, easy to administer.

Supplied: When reconstituted, 100 mg. per cc. Special calibrated droppers—5 drops (approx. 25 mg.) and 10 drops (approx. 50 mg.). 10 cc. bottle.

Tao-AC (Tao analgesic, antihistaminic compound)

To eradicate pain and physical discomfort in respiratory disorders.

Supplied: In bottles of 36 capsules.

Taomid® (Tao with triple sulfas)

For dual control of Gram-positive and Gram-negative infections.

Supplied: Tablets, bottles of 60. Oral Suspension, bottles of 60 cc.

Intramuscular or Intravenous

For direct action—in clinical emergencies.

Supplied: In 10 cc. vials.

®TRADEMARK

New York 17, N.Y.
Division, Chas. Pfizer & Co., Inc.
Science for the World's Well-Being

LEDERLE LABORATORIES, a Division of AMERICAN CYANAMID COMPANY, Pearl River, New York

Medical Appliances

Our medical appliance department does expert fitting of:

Elastic hosiery
Breast prostheses
Cervical braces
Taylor back braces
Rib belts
Pelvic traction belts
Dorso-lumbar supports
Lumbo-sacral belts
Maternity brassieres
Maternity belts
Trusses

Fittings by prescription only

Munns Medical Supply Company

Topeka, Kansas

Tenth and Horne Streets **Telephone CE 5-5383**

Malpractice Prophylaxis

WHEN TROUBLE LOOMS,
DON'T DISCLOSE
INSURANCE;
NOTIFY INSURER.

Specialized Service makes our doctor safer

THE
MEDICAL PROTECTIVE COMPANY
FORT WAYNE, INDIANA

Professional Protection Exclusively since 1899

KANSAS CITY Office:
R. E. McCurdy, Rep.
2020 Olathe Blvd., Apt. 305
Tel. Yellowstone 2-8929
(If no answer, call Logan 1-1498)

Planning Ahead For
Your New Clinic

One of the first decisions in the planning of your new clinic or office building will be location. You'll find the trend today is away from downtown congestion to a quiet area with a pleasant atmosphere and plenty of room for parking.

Also important is finding the financing you may need for its construction. Because of the importance of experience and reliability in financing, we suggest you consult the Mortgage Loan Department of Farmers & Bankers Life. During the past twenty years, numerous doctors throughout the state have obtained first mortgage loans from us for construction of their new clinic and medical practice buildings. We shall welcome the opportunity to take part in your planning also.

Mortgage Loan Department

Farmers & Bankers Life
INSURANCE COMPANY • HOME OFFICE, WICHITA

it's convenient to buy

OXYGEN
THERAPY
EQUIPMENT

FOR
THE
OUT
PATIENT

2

ALL THE NECESSARY EQUIPMENT — REGULATORS, HUMIDIFIERS, FLOWMETERS, CATHETERS, MASKS, CANNULAS — INCLUDING HIGH PURITY OXYGEN FOR THE TREATMENT OF THE OUT PATIENT.

RENTAL
OR
PURCHASE

REGULAR TRUCK DELIVERY SERVICE THROUGHOUT KANSAS

KANSAS OXYGEN, INCORPORATED
P. O. BOX 551 • HUTCHINSON, KANSAS • PHONE MOHAWK 5-5551

OPEN HOUSE

Please accept this invitation to visit the Kansas Oxygen Plant at the extreme east end of Carey Boulevard, 8 to 5 Monday through Friday; other times by appointment.

LEDERLE LABORATORIES, a Division of AMERICAN CYANAMID COMPANY, Pearl River, New York

Deformity Appliances of Quality

Orthopedic and Surgical Appliances

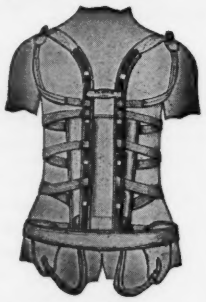
Artificial Limbs
Trusses

Abdominal Supports

Elastic Hosiery

Foot Supports

Surgical Corsets



Taylor Back Brace
Made to Order in
Our Own Factory

P. W. HANICKE MFG. CO.
1009 McGee St. VI 2-4750
KANSAS CITY, MO.

Protection Against Loss of Income From Accident and Sickness as Well as Hospital Expense Benefits for You and All Your Eligible Dependents.

ALL PREMIUMS COME FROM PHYSICIANS SURGEONS DENTISTS ALL BENEFITS GO TO

PHYSICIANS CASUALTY & HEALTH ASSOCIATIONS
OMAHA 31, NEBRASKA
Since 1902
Handsome Professional Appointment Book sent to you FREE upon request.

THE LATTIMORE-FINK LABORATORIES

Topeka — El Dorado
Kansas

J. L. Lattimore, A.B., M.D., Pathologist
A. A. Fink, A.B., M.D., Pathologist
D. T. Ferraro, M.D., Pathologist
H. C. Ebendorf, M.T., Serologist
A. C. Keith, B.S., Chemist
L. W. Hull, A.B., Bacteriologist
Walter Norris, A.B., Chemist

Anatomical and Clinical Pathology

Containers Furnished Upon Request

The Neurological Hospital

2625 West Paseo,
KANSAS CITY, MISSOURI

★ ★ ★

A voluntary hospital providing the care and treatment of nervous and mental patients and associate conditions.

RENTALS ★ SALES

HOSPITAL BEDS WHEEL CHAIRS
INVALID LIFTS INVALID WALKERS

★ BRACE SHOP ★
Certified orthotist and skilled technicians on duty at all times

PETRO'S SURGICAL APPLIANCES
618-20 Quincy Topeka, Kans. Ph. CE-40207

CLASSIFIED ADVERTISEMENTS

INTERNIST WANTED to establish private practice with group of private practitioners in large office building in fast-growing midwest city. Write the JOURNAL 2-59.

WANTED—G.P. surgeon with two years training to help with growing practice in rural community. New clinic building, north central Kansas. Write the JOURNAL 1-59.

Nationally advertised Surgical Supplies and Equipment for your convenience at Topeka, Joplin, Kansas City, St. Joseph

GOETZE NIEMER CO

Traditions established during 60 years management by Dr. W. F. Goetze (AMA) assures intelligent servicing of your orders

Our 75th Year...
of serving physicians of the Middle West with high quality and rigidly controlled pharmaceutical products.

SUTLIFF & CASE CO., INC.
Pharmaceutical Specialties
PEORIA, ILLINOIS

PENTAFORT

Provides BOTH fast and prolonged vasodilation for practical prophylaxis in angina pectoris.

Combines TWO (Nitroglycerin and Pentaerythritol Tetranitrate) time tested coronary vasodilators in a stable and economical dosage form.

Glyceryl Trinitrate (Nitroglycerin) 1/150 gr.
Pentaerythritol Tetranitrate .... 15 mg.
Thiamin Mononitrate ..... 5 mg.

LEDERLE LABORATORIES, a Division of AMERICAN CYANAMID COMPANY, Pearl River, New York

Index to Advertisers

Abbott Laboratories .... 39, 40, 41, 42, 43, and facing 38
Ames Company, Inc. ..... Inside back cover
Ayerst Laboratories 38

Burroughs Wellcome and Company, Inc. ..... Facing 26

Ciba Pharmaceutical Products Company, Inc. 7, 28, and 45

Endo Laboratories 13

Farmers and Bankers Life Insurance Company 59

Geigy Pharmaceutical Division 24
Glenbrook Laboratories 30
Goetze Niemer Company 61

Hanicke, P. W., Manufacturing Company 60

Kansas Oxygen, Inc. 59

Lattimore-Fink Laboratories 61
Lederle Laboratories
.. 8, 9, 19, 23, center section, 36, 37, 46, 58, 60, and 62
Lilly, Eli, and Company 32
Lorillard, P., Company 34

Medical Protective Company 58
Merck, Sharp and Dohme, Inc. 5, 10, 11, 54, and facing 46
Munns Medical Supply Company, Inc. 58

Neurological Hospital 61

Parke, Davis and Company ..... Inside front cover and 3
Petro's Surgical Appliances 61
Pfizer Laboratories ..... 14, 15, 49, and 55
Physicians Casualty Association 60
Prairie View Hospital 62

Ralph Clinic ..... Center section
Robins, A. H., Company, Inc. ..... 16, 17, and 21
Roerig, J. B., and Company, Inc. ... 26, 35, 48, 56, and 57

Schering Corporation ..... 31 and facing 18
Searle, G. D., and Company 33
Seven-Up Bottling Company 44
Smith-Dorsey ..... 18, 22, 47, and 53
Smith, Kline and French Laboratories ..... Back cover
Squibb, E. R., and Sons ..... 20 and 52
Sutliff and Case Company, Inc. 61

United Nations 6
University of Kansas Medical Center ..... Center section
Upjohn Company ..... 27, 50, and 51

Vent-Air Lens Laboratories 29

Wallace Laboratories 12
Winthrop Laboratories ..... Facing 54
Wyeth Laboratories 25

Prairie View Hospital

Newton, Kansas

Emphasizing a therapeutic milieu and psychotherapy. A non-profit psychiatric service of the Mennonite Central Committee.

AN AMES CLINIQUICK™

CLINICAL BRIEFS FOR MODERN PRACTICE

Is there a relationship between premature impotence and diabetes?

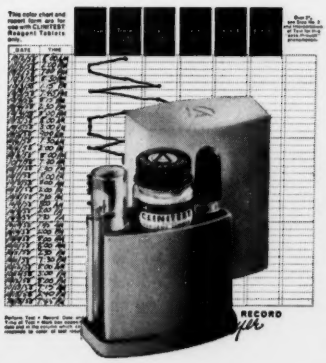
Yes. The incidence of premature impotence was studied in 198 diabetic men,[1] and found to be two to five times higher than that reported for the general population.[2] In many of the cases observed, impotence developed early in the history of the disease, suggesting that the possibility of diabetes mellitus be considered whenever a man complains of premature impotence.

(1) Rubin, A., and Babbott, D.: J.A.M.A. *168*:498, (Oct. 4) 1958. (2) Kinsey, A. C.; Pomeroy, W. B., and Martin, C. E.: Sexual Behavior in the Human Male, Philadelphia, W. B. Saunders Company, 1948.

FOR EVEN BETTER CONTROL OF THE MODERATE AND THE SEVERE DIABETIC

uniformly reliable readings with

COLOR-CALIBRATED CLINITEST® BRAND *Reagent Tablets*



the STANDARDIZED urine-sugar test that provides reliable quantitative estimations *throughout* the critical range.

results that are easier to interpret

The new CLINITEST Urine-Sugar Analysis Set contains the standard color scale that provides a complete range of readings without omissions... includes the critical ¾% (++) and 1% (+++)... and an improved analysis record form.

Daily urine-sugar readings may be connected to form a clinically useful graph ...a day-to-day "urine-sugar profile" that reveals at a glance individual trends and degree of control.

AMES COMPANY, INC
Elkhart • Indiana
Toronto • Canada

65059

relief from the suffering and
mental anguish of

cancer

THORAZINE* (chlorpromazine, S.K.F.)

one of the fundamental drugs in medicine

Smith Kline & French Laboratories

*T.M. Reg. U.S. Pat. Off.

Thorazine Medical Library,
State House,
Topeka, Kansas